Vol. 191 82nd Year No. 3513

THE GAS JOURNAL

SEPTEMBER 17, 1930

A Glance at the Contents—

North British Association of Gas Managers.

The Sixty-Ninth Annual General Meeting of the North British Association of Gas Managers was held in Cowdray Hall, Schoolhill, Aberdeen, on Thursday, Sept. 10. Mr. David Fulton, of Helensburgh (the President), occupied the chair, and the attendance was considerably above the average. A full report of the proceedings of this meeting will be found on later pages of this issue.

The Lighting of Birmingham.

This subject is dealt with by Mr. R. Mason, Public Lighting Superintendent to the City of Birmingham, in a paper before the Association of Public Lighting Engineers at Leicester. Mr. Mason gives a brief résumé of the gradual changes which have taken place in the lighting of Birmingham from his own experience, and goes on to give particulars of the lighting as it exists to-day. The city has an area of 46,687 acres and a population of nearly one million. About 660 miles of street are lighted by gas and six miles by electricity.

"Assidue Exquirendo Servire."

The William Young Memorial Lecture this year was given by Sir Arthur Duckham, G.B.E., K.C.B., M.Inst.C.E., M.Inst.Gas E., at the meeting of the North British Association of Gas Managers in Aberdeen on Sept. 11. In giving this lecture Sir Arthur said he felt he could not do better than take as his text the new motto of the Institution of Gas Engineers—"By Diligent Investigation We Serve." The lecture deals with contractors' problems, selection of coal, temperature of carbonization, steaming, maintenance costs, and various other matters in connection with gas and bye-products practice.

Pay Through Meter.

In a paper before the North British Association of Gas Managers in Aberdeen, Mr. Andrew Walker, Engineer and Manager to the Kilbarchan Gas Undertaking, explains how this system came to be introduced in his district and the reasons which prompted its adoption. With a view to reducing the unaccounted-for gas, a policy was shaped towards increasing the gas sold per consumer, and special attention was given to the use which might be made of the slot meter. Consumers were offered every encouragement to change over, and circumstances enabled the undertaking to make a substantial reduction in the price of gas. Instead of altering the change wheels the rebate was simply handed back.

109,000 C.Ft. Per Foot Run of Bench.

Details are given of a remarkable new installation of "W.-D." verticals, and other recent extensions, at the Aberdeen Gas-Works, which were inspected by the Town Council on Wednesday of last week. The new carbonizing plant contains 28 retorts of the latest and largest type. Each retort is capable of carbonizing 11 tons of coal per 24 hours, or a total daily capacity of 308 tons, equivalent to about 4½ million c.ft. of gas. This plant displaced 14 beds each of eight horizontal retorts, capable of producing 1½ millions per 24 hours, and occupying 10,080 sq. ft. of ground area. The new vertical bench, producing three times as much gas, occupies only 7607 sq. ft.; the remaining space being taken up by reinforced concrete hoppers capable of taking 500 tons of coke and 50 tons of breeze.

A Flueless Heater Patent Specification.

A patent taken out by the Gas Light and Coke Company, Mr. J. G. Clark, and Mr. C. A. Masterman for flueless heaters is explained and illustrated on a later page to-day. The invention has for its object to provide an improved construction of heating appliance which may be used with gas or oil and which, while retaining the advantage of reflecting the light from luminous flames into the room, obviates the danger of the metal or material of which the appliance is made becoming excessively hot, the construction being such that the issuing products of combustion are air-cooled so that the temperature of these products does not attain an excessively high value.

National Gas Council Meeting.

A number of topical subjects received attention at a meeting of the Central Executive Board of the National Gas Council, held at 28, Grosvenor Gardens, S.W. 1, on Sept. 9—Mr. William Cash (Vice-Chairman) occupying the chair in the absence of Sir David Milne-Watson. It was reported that on July 31 a deputation from the National Joint Industrial Council for the Gas Industry had waited upon Mr. Wm. Graham (President of the Board of Trade). The deputation had been introduced by Mr. Will Thorne, M.P., who had drawn attention to the conditions which existed when Parliament legislated for the gas industry in 1847 and 1871, and had emphasized the necessity for immediate amendment of the existing antiquated legislation.

Practical Use of a Test Room for Lighting Departments.

We look forward to the time, remark Mr. W. L. Marshall and Mr. R. H. Redmill, in their joint paper before the Association of Public Lighting Engineers, when each and every lighting department will be equipped with a test room. The work carried on here, continue the authors, will generally be confined to problems directly affecting practical work; and these can be divided into two broad sections—theory and practice. Theory usually, but not always, precedes practice, and tests are often limited to checking theory, corroborating makers' figures, and maintaining service results. In performing these duties alone a test room justifies itself. It frequently happens, too, that these practical tests disclose defects in the construction of plant, and makers are generally pleased to receive constructive criticism of their products.

Public Lighting as Viewed by the Motorist.

From the viewpoint of all forms of traffic, and in the interests of public safety, streets should either be properly lighted or not lighted at all. This is the opinion of Mr. H. Sturgess-Wells, J.P., expressed in a paper before the Association of Public Ligthing Engineers at their conference held in Leicester, when he discussed public lighting as viewed by the motorist. If I were asked, concluded the author, whether I prefer gas or electricity, I would answer *gas*, for reasons of better dispersion of light without the concentrated bright patches which I have observed from electricity, which appear, in some schemes, to make the lighting effect "patchy" and to produce dark shadows in the road between the lamps, with which motorists are all too familiar. I have also noticed how gas illumination appears better to penetrate fog, which is the reason for motorists using an orange screen on their electrically-illuminated headlights.

EDITORIAL NOTES

Pressing Forward

A LARGE part of this issue of the "JOURNAL" is occupied with the recording of the proceedings at two Association meetings, and very good reading the report makes, too, from the point of view of the gas industry. At Aberdeen, the North British Association were in fine fettle; the members having placed before them technical fare of a high order. Of this more will be written in following articles, so that it is necessary here to say only that the report contains much to encourage and nothing which should discourage. That there is great opportunity for the gas manager who will seize it, seems the moral to be drawn.

The second meeting dealt with to-day is that of the Association of Public Lighting Engineers, and here, again, there is abundant evidence of the vitality of the gas industry. Valuable contributions—some of which were reproduced in last week's "JOURNAL"—were made to the proceedings, and in these gas had a part fully in keeping with its importance. Though we are assured that the number of electric lamp standards in use has increased by 100 p.ct. during the last five or six years, the quantity of gas consumed for this purpose, it is noted, goes on increasing side by side with the growth in the use of electricity. And the reason will be obvious to those who study the proceedings at last week's gathering of the Association of Public Lighting Engineers. We regard the proceedings at this meeting as particularly striking, inasmuch as, in an organization concerned with both the gas and the electrical industries, it is seen that gas is well able to hold its own. In such a matter as street lighting, there must necessarily be competition between the two illuminants, but with an Association of this character in being, there should be no excuse for ignorance of the real facts.

At a time when—steeped as the industries of the country are in depression—there is, perhaps, some tendency to look at things on the dark side, the proceedings of the two Associations to which attention is now drawn may prove a wholesome corrective. So far as the Public Lighting Engineers are concerned, the main papers (from the gas point of view) and the Presidential Address were commented on in our last issue. We may now turn to the contributions to the North British meeting—leaving that of Mr. Sim for consideration next week.

"Assidue Exquirendo Servire"

IT was a happy inspiration which led the author, Sir Arthur Duckham, to take the new motto of the Institution of Gas Engineers for the title of his William Young Memorial Lecture. We have grown accustomed to expect something out of the ordinary in these particular lectures, and for this occasion Sir Arthur Duckham has given the gas industry an exceptionally stimulating paper. No one will dispute his opening statement that practically the whole of his life "has been devoted to the development of new ideas and the study of fuel problems." He has certainly lived up to the motto which forms the subject of his lecture: "By diligent investigation we serve." It is questionable whether any other inventor or investigator in recent times has had a more profound influence on the processes of gas manufacture, and it falls to the lot of but few men to see their work bear such fruit. Sir Arthur has during the past thirty years been one of the vital progressive forces in the gas industry, and by his enthusiasm and vigour has been a source of encouragement and inspiration to all who have come in contact with him.

The theme of the William Young Lecture is to detail some of the problems with which he has been faced, considered from the point of view of the contractor rather than that of the engineer in charge of a works. There will be general agreement with his statement that the interests of the gas industry have been well served by the contractors. There is to-day a much more ready acceptance of the principle of co-operation between those engaged in gas production and those occupied in the manufacture of plant and equipment—co-operation for the common weal. A striking recognition of this attitude is the recent decision of the Institution of Gas Engineers to extend their membership along these lines. According to Sir Arthur—and he ought to know—"to be successful, a contractor must gain a reputation for technical ability and high potentiality for service." In other words, a contractor must adopt the motto, even if he cannot attain membership of the Institution of Gas Engineers.

The first subject dealt with is the factors influencing coal carbonization. Sir Arthur makes the suggestion that too often efficiency in operation is sacrificed by the indiscriminate use of widely varying types of coal, and points to the absurdity of working an internal combustion engine on varying fuels. Two methods of obtaining greater regularity are offered—first, buying similar types of coal; secondly, blending or intimately mixing the differing coals to get a constant mixture. Emphasis is also laid on the importance of coal size upon the process of carbonization. This subject has been stressed within the past few weeks by the publication of a technical paper by the Fuel Research Board (reviewed in our columns on Aug. 27, p. 477).

The remarks relating to steaming retorts are of particular interest. Sir Arthur states that "it is by no means a foregone conclusion that large thermal yields obtained by intensive steaming lead to the cheapest gas." He makes the suggestion that, owing to the number of variable factors, generalization is impossible, and it is necessary to work out a balance-sheet in each individual case. Summing up the position of modern carbonizing plants, it is stated that the aim in developing such plants has been to obtain greater simplicity, strength, and ease of control. Sir Arthur considers that there is still great scope for invention, research, and achievement, and he urges the gas industry to see that "antiquated technique does not obstruct the path of progress." The importance of good refractory materials is stressed, and it is satisfactory to note the opinion that "our British materials are certainly as good as, if not better than, the materials from any other country" expressed by a contractor who is buying such large quantities.

Space will not permit us to comment on a number of interesting points raised by Sir Arthur on such subjects as maintenance costs, producer designs, and so on; but before leaving the subject of carbonization, we would underline his remarks concerning co-operation. He states that "although first steps in design, construction, and operation of the carbonizing plant lie with the contractor, this work could not have advanced as it has without the hearty co-operation of all those engineers running the plants. It is the experiences and suggestions of our clients which drive us to think ahead and plan accordingly; it is the criticisms of our clients which keep us from resting on our oars."

As we would have expected, Sir Arthur deals forcibly with the subject of coke. He refers to the undoubted stimulus which the "Coke Competition," organized in the "JOURNAL" some five years ago, gave to the subject of improved coke. In passing, it may be interesting to record that even to-day we are unavailingly asked for the special number which contained the various papers submitted for this Coke Competition. Although the collection of papers may not have been startlingly original, yet the very focussing of attention on the subjects of coke production, preparation, and utilization has had a lasting effect. Sir Arthur rendered a real service to the Industry when, by reason of his foresight and generosity, the Coke Competition was made possible.

Equal emphasis is laid on the importance of tar, and Sir Arthur urges the need for extensive research work "by a fully equipped organization under a devoted chief." We assume that Sir Arthur means that this organization should be controlled by the tar producers. He stresses the importance of this matter by showing that an increase in the value of tar by £1 a ton would benefit the gas

industry by nearly £1,000,000 per annum. It certainly seems that the whole tar position needs grappling with in a comprehensive way for the good of the gas industry. Sir Arthur wants to see the stimulation of interest in tar treatment and utilization and suggests a publication "A Thousand-and-One Uses for Tar." Possibly the newly appointed Chairman of the British Road Tar Association will follow up this suggestion.

An Inspiring Example

In reviewing the Board of Trade Return relating to authorized gas undertakings in 1929, we called attention in these columns a fortnight ago to the remarkable growth not only in the number of prepayment consumers, but also in their average annual consumption. Thanks to an addition of 200,000 prepayment consumers to the books last year, the total has increased to well over 5 millions, and their consumption is rapidly approaching that of "ordinary" users. As we said, this affords sufficient proof of the desirability of giving the fullest facilities, by way of hire of appliances, free fixing, and so on, to the small consumer. And it is interesting to turn from the general to the particular, and to see how the enterprising methods of a small undertaking have helped to swell the total result—a result which would undoubtedly be even more gratifying if all small concerns adopted similar, if modified, methods and pursued them with the same pertinacity. The undertaking to which we refer is that at Kilbarchan, and the story of its progress was told by the Engineer and Manager, Mr. Andrew Walker, before the North British Association of Gas Managers, by whom it was enthusiastically received.

Mr. Walker's paper was, indeed, a refreshingly terse and interesting contribution to the proceedings. As a condensed tale of virile and whole-hearted service, on sensible lines, carried on over a period of years with sustained enthusiasm, it forms a record which might profitably act as an example and stimulant to the whole industry. The fact that the record relates to a small works only emphasizes its message. Here is the Gas Manager of a Scottish village, who ten years ago took control of a little works with an annual output of 10 millions, an average output per consumer of about 10,000 c.ft. per annum, and a gas leakage of over 20 p.ct. Could a more depressing proposition be imagined? And yet, with a spirit of cheery optimism, and the exercise of sound business methods, a derelict concern is gradually converted into a useful and prosperous undertaking, providing a public service appreciated by the whole community. The vein of humour running through the record, and so obvious in delivery and reply to the discussion, added greatly to the pleasure of those who heard it. A strong spirit of sturdy self-help, and a firm resolve to make a success of his concern, must have a heartening effect on a manager. Initiative, enterprise, and determination are the dominating notes in Mr. Walker's record. These qualities have brought success in Kilbarchan, and they will just as certainly bring corresponding success elsewhere.

What a Small Undertaking Can Do

The remarkable results achieved by Mr. Walker at Kilbarchan have been due very largely to the attention which has been paid to the prepayment consumer, which has had the effect of enabling gas to be sold at half the price charged in 1920, and of reducing the capital employed per million in almost exact inverse ratio to increased sales. Considering that among the small undertakings in Scotland making 20 million c.ft. and under each year the average consumption varies from 22,000 c.ft. to 6000 c.ft. (and the same sort of thing applies to England), the scope for improvement is evident.

The first move made in Kilbarchan was to reduce the price of gas, and instead of immediately altering the change wheels of the meters, handing the rebate to the consumers. Psychologically this had an effect beneficial to consumer and supplier alike. The gas undertaking was able to point out defective appliances, and to offer to put matters right via the rebate. At the beginning of the scheme the consumer was entitled to make his own terms of payment, and he was allowed a month's trial of the apparatus free from obligation. Such a system could hardly be put into operation in a large town, and even Mr. Walker had to modify the arrangement later, because some consumers had a peculiarly elastic notion of terms; but it shows that in certain directions the small concern, the manager of which is in close touch with all the consumers, has definite advantages which ought to be more fully exploited. Moreover, the practice of mutual trust ought to be more broadly recognized than at present; it creates goodwill and is a paying proposition. The permanent deposit system, for example, is not easy to understand. In this connection we are reminded that some years ago an American gas company decided not to require a deposit where a consumer could give satisfactory credit references. They also refunded deposits already on their books as soon as the customer's credit was established. The loss from uncollectible bills decreased by more than half. Mutual trust has certainly worked smoothly at Kilbarchan.

The provision of expert fitting work at Kilbarchan was followed, two years ago, by the establishment of a showroom; and the business which it brought, says Mr. Walker, "has been a revelation"—so much so that he maintains that the small works without a well-equipped showroom is losing a golden opportunity. The whole of Mr. Walker's account shows the importance of the small manager to our industry, and the excellent results which inevitably follow in the train of good service even in the smallest community. No order should be thought insignificant; and the following quotation from the contribution under review explains why it is that the Kilbarchan Gas Undertaking is so successful: "We are prepared to lay our goods on the doorstep, and no order is too small to deliver and fit, and no complaint too trivial for immediate attention." There is a very important point to remember about service such as this—that it sets up a rampart against the invasion of electricity. There is as yet no electrical competition in Kilbarchan. When it does arrive, it will find that the gas consumers are appreciative of the services to which they have become accustomed from the gas undertaking; they will remember that they had not to await the advent of electricity before receiving these services. And regarding future competition, Mr. Walker is setting an admirable example by concentrating on the lighting load—"our front line trenches, and the point most liable to attack."

New Stock Exchange Regulations

Since the Hatry case last autumn, and the consequent financial depression following these disclosures, various methods have been suggested in an attempt to restore public confidence and provide some more certain means of protecting the investor—especially the smaller class of shareholder. One suggestion which has been adopted in a number of instances was for the transfer registers of companies having their shares quoted on the London Stock Exchange to be checked periodically by the auditors, quite apart from the routine of the annual audit. This expedient has had the effect generally of inspiring confidence; but various objections have been advanced to the general adoption of the idea.

In January last, the Committee for General Purposes of the Stock Exchange (London) took a definite step in the direction of strengthening the regulations applicable in the case of companies desiring official quotations in respect of their shares, and also in regard to the prevention of unsound underwriting and the issue of fraudulent documents. The Sub-Committee on New Issues and Official Quotations then appointed have recently issued their full report, and we may refer briefly to the recommendations relating to new issues and the conditions to be observed before "permission to deal" in the stocks or shares will be granted.

In the case of Government and Municipal loans, as well as issues by companies incorporated by Special Act of Parliament, it will be necessary for the following information, *inter alia*, of the undertaking to be advertised: Full particulars of the share or loan capital in which leave to deal is to be applied for, and in particular: The rights

as to income and capital, amount and application of any sinking fund, any right to redeem before maturity or to convert, and the security upon which any loan is charged; the dates of, and parties to, all material contracts affecting the issue of such share or loan capital; the details of any share or loan capital under option or agreed to be under option, and the consideration for which the same was granted; the names of directors and auditors, stating qualification, name and address of secretary, situation of chief office, and name of bankers or London brokers. In the case of limited liability companies, the Committee will require the company to number the allotment letters serially; fix a maximum period, not exceeding six weeks for the renunciation of fully-paid shares and one month after date of final call in respect of partly-paid shares; print form of renunciation on, or attach same to, back of allotment letters; and have split allotment letters and split letters of rights certified by an official of the company.

The Committee report that it is realized that it would be unreasonable to insist that the new regulations should have a retrospective effect, but confidence is expressed that directors and secretaries of companies, and others, will co-operate with the Committee and carry out the regulations for the protection of the public. The Committee report favourably on the value of the audit of allotments and of transfers, either by internal or professional auditors, but no definite regulations are made. It is stated, however, that in future the methods of every company included in the Stock Exchange Official Intelligence will be noted therein. The Committee further consider that the auditors' annual certificate should state that the share register has been checked, and that the number of shares issued agreed with that shown in the balance-sheet.

These final recommendations, which are based on the views expressed to the Sub-Committee by representatives of the banking, legal, accountancy, and secretarial professions and others, were adopted at a meeting of the General Purposes Committee on Aug. 11 last, and, in conjunction with the Companies Act, 1929, should assist in restoring the confidence so necessary in business affairs.

Importance of Adequate Lighting.

Though admittedly a high standard of both natural and artificial light is the general rule in new factories, it is pointed out in the recently issued annual report of the Chief Inspector of Factories that bad systems of lighting still cause accidents. Adequate lighting is essential if the best work is to be performed under the safest conditions; and in this respect gas is in a position to offer perfect service. The numberless existing good gas lighting installations in factories may be added to—a fact which is well worth keeping in mind by gas undertakings in industrial areas.

Coal Consumption Figures.

The Ninth Annual Report of the Secretary for Mines, for the year 1929, contains a table showing the comparative consumption of coal by the most important industries in this country over a period of sixteen years. From this table it would appear that, whereas in the year 1913 the iron and steel industry used the largest amount of coal consumed by any individual industry—namely, 31,400,000 tons (approx.), or 17 p.ct. of the total—the coal consumed at gas-works (excluding the coal equivalent of gas coke exported) amounted to 16,700,000 tons, or 9·1 p.ct. of the total. For the twelve months ended Dec. 31, 1929, the approximate figures were as follows: Iron and steel works, 23,290,000 tons (13·4 p.ct.); gas-works, 16,750,000 tons (9·7 p.ct.). The corresponding figures in respect of electricity generating stations belonging to authorized undertakings and to railway and tramway authorities were: 1913, 4,900,000 tons, or 2·7 p.ct.; 1929, 9,890,000 tons (approx.), or 5·7 p.ct.

For which, many thanks!

More gas is required by the growing population of lower Harrow, and to supply them a new gasholder is necessary. This is what the Journal of the Royal Society of Arts has to say about it: "Must this of necessity destroy the beauty of that fine outlook, or could it conceivably be so distressing as modern Harrow, with its untidiness and ill-ordered advertisements? We are sure that Sir David Milne-Watson and Sir Francis Goodenough will consider any proposal to place this necessary requirement of our modern life in the landscape in as seemly a way as possible. . . . There is evidence that they are mindful of public amenities in all their activities. We believe that this might be made almost a feature in the broad landscape if placed rightly and if some tall poplars or other groups of planting were placed so as to reduce its scale, and if some consideration were given to the colour and design of the skyline of the holder. We are not distressed at the appearance of such necessities of life so much as at all the untidiness that so often surrounds modern undertakings. We should prefer to have a properly placed gasholder in view than the chaotic lines of a modern building estate."

PERSONAL

Mr. W. H. Dreaper, Plant Superintendent of the B.C. Electric Power and Gas Company, Ltd., Vancouver, B.C., is at present in this country on a visit, his address being 33, Westbourne Terrace, Stockton-on-Tees.

At the meeting of the British Association for the Advancement of Science, held at Bristol last week, Mr. Walter T Dunn, M.I.Mech.E., formerly Secretary to the Institution of Gas Engineers, was elected a member of the General Committee.

Last Thursday, before handing on to Mr. H. G. Ritchie the chain of office of the North British Association, Mr. David Fulton entertained some forty friends to an informal luncheon at the Palace Hotel, Aberdeen. Sir Arthur Duckham and Baillie Carry, the Deputy Lord Provost, were the guests of honour. Speech-making was reduced to the minimum—the Loyal Toast and that of Mr. Fulton; and rarely have musical honours possessed such a ring of sincerity, or been better deserved.

OBITUARY

The death occurred on Tuesday of last week of William David Jones, aged 69, of Stourbridge. Mr. Jones was for a time Gas Manager at Abercarne, Wales, and subsequently was engaged at the Ebbw Vale Gas-Works. Since 1906, Mr. Jones has been with the firm of Messrs. Timmins & Co., Ltd., firebrick manufacturers.

Forthcoming Engagements.

Sept. 18.—Society of British Gas Industries.—Council Meeting in the afternoon.

Sept. 18.—Southern Association of Gas Engineers and Managers (Eastern District).—Meeting at the Incorporated Accountants' Hall, Victoria Embankment, W.C. 2, at 2.30 p.m.

Sept. 22-24.—Ceramic Society.—Joint meeting of the Refractory Materials Section and the Building Materials Section, in London.

Sept. 23.—Institution of Gas Engineers.—Meeting of Education Committee (4 p.m.), 28, Grosvenor Gardens, S.W. 1.

Sept. 26-28.—National Smoke Abatement Society.—Annual Conference at Leicester.

Sept. 30.—British Commercial Gas Association.—Education for Gas Salesmen Committee.

Oct. 3.—North of England Gas Managers' Association.—Meeting at Darlington.

Oct. 7.—British Commercial Gas Association.—Executive Committee Meeting.

Oct. 10.—Manchester District Institution of Gas Engineers.—Visit to the Partington Gas-Works.

Oct. 15.—British Commercial Gas Association.—General Committee Meeting.

Oct. 15.—Eastern Counties Gas Managers' Association.—Autumn Meeting in London.

Oct. 22-23.—Institute of Fuel.—Annual Conference at the Institution of Electrical Engineers, Victoria Embankment, W.C. 2. Annual dinner at the Connaught Rooms, Great Queen Street, W.C. 2, on Oct. 22.

Oct. 27 to 29.—British Commercial Gas Association.—Annual Meeting at Hull and Bridlington.

Nov. 19.—Society of British Gas Industries.—Autumn General Meeting in London.

Nov. 25-26.—Institution of Gas Engineers.—Autumn Meeting at the Incorporated Accountants' Hall, Victoria Embankment, W.C. 2.

CORRESPONDENCE

Gas Fire Campaign.

SIR,—I have been very interested in your comments and correspondence relating to the "Gas Fire Campaign."

I am, in the first place, a strong advocate for the simple hire of gas fires and at low rentals, and, further, for the regular examination and maintenance of fires. Our experience in Hereford has shown very clearly that low rentals and efficient service, together with advertising, contribute very largely to the success of gas-fire business. Last season, we reduced all our rentals for gas fires by 50 p.ct. This means that a consumer can hire an 8-in. fire at 9d. per quarter, with larger sizes in proportion. In addition, we fix free up to 30 ft. of supply pipe. I am of opinion, too, that the new Beam radiants have been of great advantage to the industry. In nearly every inquiry handled by my Department the consumer has asked for fires with the "new fuel," and from personal experience I must support their desire.

For a comparatively small undertaking, with 6237 consumers, we have nearly 2000 gas fires on simple hire, and we are increasing this number by several hundreds per season. Hereford is essentially a residential district, and there are few boarding houses, but we have one hotel fitted throughout with gas fires.

This season we have designed an illustrated sheet showing modern gas fires, and this is being hand delivered to every consumer. From past experience, literature distributed in early September brings a lot of inquiries, which in every case are immediately followed up, and a large percentage result in business. We find there is a desire on the part of consumers for fires to be fixed before Christmas, although we usually get our coldest weather in January and February. I am of opinion that the gas fire is in greatest demand for the chilly night and morning, and one notices a distinct increase in consumption when the days are shortening and the beginning and end of the day is chilly.

Our competitors are keen on the heating load, and they make a strong claim for their portable fires; but if the gas industry offer modern gas fires on hire at low rentals, and in addition maintain the fires, renewing fuel, say, every summer, I am certain we can and shall retain and increase our business.

My policy is to get into the enemy's camp and flood the district with literature, and give service to the consumer.

ARTHUR ROBERTS,
Engineer and General Manager.

Corporation Gas-Works,
Hereford,
Sept. 13, 1930.

Need for White Enamelled Geysers.

SIR,—One sphere in which gas stands alone is in the instantaneous heating of water. Are we getting as much of this business as we ought to? I think we are not. We find electrical "Sadia" storage water heaters in gas consumers' premises where gas geysers should be. What is the attraction of the "Sadia?" To my mind a great deal of the attraction is its sparkling white enamelled finish—it can be washed with soap and water—an appealing point to the housewife.

Our geysers with so-called untarnishable finishes look very well in the showroom, but in the bathroom they are out of tone with the usual white scheme. True, there are one or two firms who market a white enamelled geyser, but the price is about double that most consumers want to pay. Surely the big manufacturers with their experience in cooker enamelling can offer something better than "Art" finishes to geysers.

Failing a porcelain enamelled geyser that will sell for about £6, cannot the cellulose enamelling process be applied?

BUCKS SALESMAN.

Sept. 15, 1930.

THE NEWS OF THE WEEK

The Public Lighting of Stamford has been secured for the ensuing twelve months by the Stamford Gas Company at a total cost of £775 14s.

The Tender of the Corbridge Gas Company for the public lighting of the town has been accepted by the Council. This tender includes the supply of gas and maintenance of 58 street lamps for about 32 weeks at a cost of £3 2s. per lamp.

The Opening Meeting of the Illuminating Engineering Society will be held at the E.L.M.A. Lighting Service Bureau (15, Savoy Street, Strand, W.C. 2) at 6.30 p.m., on Wednesday, Oct. 8, 1930, when the Chair will be taken by the President (Lieut.-Colonel Kenelm Edgcumbe, T.D., M.Inst.C.E., M.I.E.E.). A report on progress in illuminating engineering will be presented and will be followed by a display of exhibits illustrating recent developments in illumination. The Hon. Secretary (Mr. J. S. Dow, 32, Victoria Street, S.W. 1) will be pleased to hear from any members desiring to exhibit equipment or apparatus.

A Five Guinea Competition, commencing with the November issue, has been decided upon by the proprietors of "The Welder." This monthly prize will be offered for the best illustrated article describing interesting jobs undertaken by the electric arc-welding process. The Competition is open to all readers of "The Welder," and it should be emphasized that the object is not so much to obtain literary essays on welding, as to obtain details relating to interesting welding practices. The articles should not exceed 500 words in length, and must describe work carried out with material manufactured either by Alloy Welding Processes, Ltd., or Premier Electric Welding Co., Ltd. Each article must be accompanied by illustrations, either photographs or drawings. Particulars may be obtained from The Editor, "The Welder," Ferry Lane Works, Forest Road, E. 17.

An Electricity Failure at Nottingham for one and a half hours on the night of Sept. 6 threw a large portion of the city into darkness. Kinema audiences sang in the dark, and people in a dance-hall waltzed by the light of candles. Many shopkeepers closed down. A serious operation at the hospital had only just concluded when the light failed.

A Series of Lectures on "Coke Oven and Bye-Product Work," to be given at the Technical Institute by Mr. G. J. Greenfield, M.Sc., A.R.C.S., has been arranged by the Rotherham Education Committee. The lectures, which number six, will provide an opportunity of obtaining useful information with regard to the plant and processes involved in coke oven and bye-product recovery work. The subjects dealt with include the conversion of coal into coke, the control of temperatures, operation of ovens, gas coolers, uses of coke, tar, and tar products, recovery of sulphate of ammonia, uses of ammonia, and recovery and uses of benzole. Visits are to be arranged to coke oven and bye-product works in the district.

The New Scale of Charges adopted by the Glasgow Gas Department shows a distinct reduction to users of gas for industrial purposes. The rates for power, manufacturing, or any other industrial purpose, which will operate until further notice, are as follows: For a guaranteed consumption per annum of not less than 50 million c.ft., 1s. 4d. per 1000 c.ft.; 40 millions, 1s. 6d.; 30 millions, 1s. 7d.; 20 millions, 1s. 8d.; 15 millions, 1s. 9d.; 12 millions, 1s. 10d.; 10 millions, 2s.; 8 millions, 2s. 2d.; 6 millions, 2s. 4d.; 4 millions, 2s. 6d.; 2 millions, 2s. 8d.; 1 million, 2s. 10d.; ½ million, 3s.; ¼ million, 3s. 2d.; and less than ¼ million, 3s. 4d. All contracts terminate on Sept. 15, 1931, but any contract entered into for part of a year, the annual consumption (for scale rate) will be calculated in ratio to the whole year. Where the actual consumption of gas is less than the quantity guaranteed, the total consumption will be charged at the appropriate rate for the quantity consumed.

THE NEWS—*continued.*

Economic Working and increased price for residuals are stated to account for the reduction in the price of gas decided upon by the Peterhead Town Council. The Council unanimously adopted a recommendation by the Gas Committee to reduce the price of gas from 4s. 6d. to 4s. 3d. per 1000 c.ft. They also agreed to increase the discount to consumers for motive power from 7½ p.ct. to 10 p.ct.

Special Classes are being held this season at the Birmingham Central Technical College in paint and varnish technology, gas engineering, gas supply, and engineering chemistry. Arrangements have been made for the National Certificate courses in Gas Engineering and Gas Supply. Classes are, as in previous years, also provided in gasfitting; the Superintendent being Mr. R. J. Rogers, of the Birmingham Gas Department.

The Co-Partnership Report of the Watford and St. Albans Gas Company for the year ended June 30, 1930, shows that the bonus and interest paid by the Company amounts to the sum of £1663 14s. 1d. As from Jan. 1, 1930, 128 St. Albans employees have been accepted as co-partners. The St. Albans Company set aside a sum sufficient to credit each of the above employees with bonus from Jan 1, 1928, and the interest due thereon. The total number of co-partners is now 335.

Progress, Side by Side, was the opinion expressed in regard to gas and electricity by Rotarian T. R. Cook, the Rotherham Corporation Gas Engineer, in an address to members of Rotherham Rotary Club on Wednesday, Sept. 10, when he dealt with the uses of gas, the development of the Rotherham Corporation Gas Undertaking, and the South Yorkshire Gas Grid Scheme. Although contending that in some instances gas was to be preferred to electricity, he expressed the view that each had its sphere of usefulness, and they would progress side by side in the future for the benefit of the community.

The Plastometer, a new instrument for measuring the plastic properties of coal, was explained by Mr. Joseph D. Davis at the recent Cincinnati meeting of the Division of Gas and Fuel Chemistry of the American Chemical Society. The principle of the instrument, he stated, is that of the torsion viscosimeter. It provides for heating a coal sample at a specified constant rate, without access of air, over the plastic range and for measurement of resistance offered to stirring. The temperature at which the coal begins to decompose is indicated and that at which it sets into coke as well. A measurement of the fluidity of the charge at intermediate temperatures is obtained.

The Construction of a New Holder of a million c.ft. capacity, the estimated cost of which is £20,300, has been recommended to the Council by the Skegness Gas Committee. A report submitted by the Manager of the Undertaking (Mr. Fred Young) shows that the output of gas has risen from 44 million c.ft. in 1922 to nearly 94 million c.ft. last year, and the maximum day's output from 181,800 c.ft. in 1922 to 484,300 c.ft. in August this year. The extension will necessitate the purchase of an additional 5¼ acres of land adjoining the present site, which measures about 1¾ acres. Assuming that a 30 years' loan at 5 p.ct. is obtained, the annual sum for repayment of principal and interest will be £1320. Last year the concern made a profit of £1083. The present ordinary price of gas is 3s. 9d. per 1000 c.ft.

French Benzole Production, according to the report presented to the ordinary general meeting of the French Benzole Producers' Association on June 13, for the year 1929 was given as 79,200 tons. Of this, 15,300 tons were obtained from gasworks and 63,900 tons from coke ovens and tar distillation works. The details of this total are made up as follows: Benzole 90's, 25,700 tons; motor benzole, 32,200 tons; toluole, 2500 tons; solvent naphtha, 6300 tons; pure benzene, toluene, and xylene, 6650 tons; and miscellaneous products, 5850 tons. If to the 79,200 tons are added the import figure of 20,000 tons, of which 12,000 tons came from the Saar, it is seen that the French benzole consumption in 1929 was about 95,000 tons. France figures fourth among the world's benzole producers, the United States coming first with 500,000 tons, then Germany with 400,000, and then England with 150,000 tons.

The Midland Ironworks, of which Mr. R. J. Milbourne is the Managing Director, being closed down for the local wakes holidays, the employees had their annual outing on Sept. 1, when the workmen entrained for Blackpool, while the staff journeyed to Church Stretton by road via Buildwas, Coalbrookdale, and Wenlock Edge. At Church Stretton, a tennis tournament and bowling contest were arranged, and these were played on the Council's courts and greens. Dinner was provided at the hotel, and afterwards the final for the bowls cup was played, resulting in a win for the Secretary, Mr. H. A. L. Bayley, who defeated the Works Manager, Mr. F. C. Franks. Owing to failing light the tennis final could not be played, and this has yet to be decided between Messrs. Handel and Bernard Beard. Mr. R. J. Milbourne, who, on rising, was received with musical honours, made the presentation to Mr. Bayley, who suitably acknowledged.

The Simmance Patent Dead-Beat Recorder.

The announcement made elsewhere in this issue by the old-established firm of Messrs. Alexander Wright & Co., Ltd., of 1, Westminster Palace Gardens, Artillery Row, S.W. 1, who are manufacturers of gas-works' scientific instruments, should be of interest to all gas managers.

The qualities of their Simmance patent dead-beat pressure and vacuum recorders are too well-known and appreciated to need reiteration, and the new designs now introduced can but enhance the reputation achieved by that firm in the production of high-class instruments for the gas industry. A pamphlet which has recently been published by the firm in connection with this new pattern recorder states that the increasing demand for these instruments has made it possible to announce a substantial reduction in price, while fully maintaining the high quality of workmanship and reliability which has always been the great feature of these recorders.

The series of Simmance dead-beat recorders includes portable instruments, with disc or drum chart, in wood or metal case; twin record; and also a continuous tape chart recorder.

Gas and Health.

During the Congress of the Royal Sanitary Association of Scotland, which opened in Edinburgh on Sept. 10 last, Sir William E. Whyte, O.B.E., Chairman of the Scottish Executive Committee of the National Gas Council, in a very interesting address, discussed the nature and extent of the gas industry's contribution to smoke abatement and to hygiene in general.

He quoted statistics showing the connection between an increase in the use of gas and a purer atmosphere. He said that in Glasgow in 1915-16 the sootfall was 450 tons per square mile. In 1920-21 it was 266 tons per square mile, while in 1921-22 it was reduced to 241 tons. The increase in the sale of gas between 1915-16 and 1920-21 was 573,514,847 c.ft., and between 1915-16 and 1921-22 only 90,182,314 c.ft. In 1921-22 the coal dispute took place, compelling the Gas Department to ration gas supplies. This accounted for the difference in the figures.

The serious effect of the smoke curse on the death-rate was shown by recent investigation. In Glasgow, when, in a spell of cold weather, natural white mists became smoke fogs, the death-rate rose much higher than in five small Scottish towns—from 35 to 223 against 31 to 93. The death-rate was higher in the industrial cities of the North than in the towns of the South of England.

If the more general use of gas would contribute to the health, comfort, and convenience of the community, the great desideratum was that it should be cheap in price. One definite way of securing this was to deal with the question of the manufacture and supply of gas from a much larger and broader standpoint than had been hitherto practised. Mass production in gas would, as in mass production of most things, contribute to the lowering of the price of the commodity.

New Richmond Fire Catalogue.

Something new and attractive is always to be found in the Richmond gas fire catalogues, and the latest publication for the coming season is no exception. One is immediately attracted by the striking cover design, depicting, on a blue background, the firm's "Renaissance II." fire in its actual colour of rich, smooth silver, reflecting the light as it falls upon its surface.

A foreword to the new catalogue points out the complete ventilation effected by the latest designs of Richmond gas grates, fitted as they are with the Radiation "injector-ventilator." By this means a healthy and agreeable atmosphere is maintained while pure radiant heat warms the whole apartment.

For the Sick-Room.

The Richmond gas grate, states the catalogue, is suitable for the sick-room, for it burns silently and maintains a steady warmth. The heat never falls low at critical hours, there are no coals to carry laboriously upstairs, and the patient is not disturbed by stoking the fire. The separate burner, supplied if desired on most patterns, is always ready for heating food or boiling water. The "Beam" radiants, with their now well-known advantages of emitting a greater proportion of visible and short infra-red energy, are supplied on every pattern of fire.

An interesting and useful chart is included in this catalogue showing the number of radiants required adequately to warm a room of any given size up to 27 ft. in length and 20 ft. in width. Thus, for a room measuring (say) 10 ft. by 12 ft., the number of radiants recommended is seven, while for a room 25 ft. long by 16 ft. wide the number of radiants suggested is 15. It is stated that these numbers will be found correct in normal conditions, but if the room is much exposed, has more than two outside walls, or is built of lighter material

than ordinary brick or stone, an allowance of 10 p.ct. should be added to the length of the room before using the chart.

FIXING THE "INJECTOR-VENTILATOR."

Particulars in regard to the fixing and adjusting of the "injector-ventilator" are given. To allow a proper operation of the "injector-ventilator," it is stated, it is necessary to provide, in the sheet iron (if this be used to cover up existing coal grate) or in the tiled back of fireplace, an opening not merely large enough to admit the flue nozzle, but such as will provide adequate admission to the chimney for the vitiated air of the room. The opening provided should extend upwards from well below the level of the bottom of the flue casting to within an inch or two of the top of the fire casting, and the width should be from two to three inches less than the overall width of the fire frame.

Illustrations of all the firm's latest gas fires are given, together with full particulars as to size, price, &c., while a number of the "lustre" finish grates are attractively reproduced in their actual colouring effect, including silver, black and silver, gold, black and gold, brown, black and copper. These "lustre" finishes, it is claimed, are lasting and refined, the artistic colours being obtained by an original process. The depth and richness of the colours are of remarkable beauty, the metallic shades being faithful reproductions of the metals named.

There are also illustrated a number of "metal-clad" gas grates. This is not a special metallic finish, but, as the name suggests, consists of a metal casing which covers the cast-iron framework of the fire. In this way, the grate is "sheathed" in actual sheet metal—*i.e.*, antique copper, brass, or pewter. This imparts a very charming "old world" appearance which not only adds to the dignity of the design, increasing its artistic merit, but is also stated to be permanently durable and requires no cleaning.

A new line in gas grates has been introduced to fit the modern tiled fireplaces, following accurately the lines of the square or round shaped fire opening, while further fires are designed to harmonize with period decorations.

Altogether this new catalogue makes a very comprehensive and useful publication.

Profit-Sharing and Co-Partnership Schemes.

The July issue of the "Ministry of Labour Gazette" contains a very interesting summary of the Profit-Sharing Co-Partnership Schemes in operation in different industries, and gives convincing proof of the steady growth of the idea which originated in the gas industry and has been adopted most generally by the public utility undertakings.

The total number of definite schemes under which employees participate in profits on some pre-arranged basis (*i.e.*, excluding schemes operating without any specified basis, or depending on the sales, or at the discretion of the employer) in existence in Great Britain and Northern Ireland at the end of 1929 was 495, representing approximately 260,000 workpeople, or nearly one half of the employees of the businesses having such a scheme in operation.

In the case of 410 schemes for which statistics are available it is shown that the average bonuses paid for the year 1929 (including schemes where no bonus was paid) amounted to £9 10s. 2d. per head, representing an average percentage addition to earnings of co-partners of 4·8 p.ct. Incidentally, the former figure is the highest recorded in a summarized table extending back to the year 1923.

By far the most popular and universal type of scheme would appear to be that under which a bonus is paid in cash or credited to a savings or deposit account in the name of the employee. A total of 12 of this class of scheme were initiated prior to 1901 and are still in operation.

Other types of scheme are set out, and include schemes in which the bonus takes the form of an issue of shares or is retained and credited to a provident, superannuation, or similar fund.

Gas, water, and electricity supply undertakings account for 65 schemes of which details are available showing that 46,100 (aproximately) employees are entitled to participate out of a total of 54,600 workpeople.

In commenting on the fact that, taking all industries together, nearly one half of the schemes started have come to an end, the report continues: "The most conspicuous exception is the gas industry; in which a large proportion of the principal company-owned undertakings have introduced schemes; comparatively few of these schemes have been discontinued, and a number have been in operation for twenty years or longer."

The total number of schemes known to have been started in connection with public utilities is 81, of which 16 have been since discontinued. Gas undertakings in the year 1929 accounted for 3 of these 16 discontinued schemes, but, be it added, the sole reason was that it was the natural outcome of amalgamations, and more gratifying still is the fact that in all three cases the gas companies taking over the amalgamated undertakings already have co-partnership schemes in operation.

Mention is made of the more prevalent practice in later schemes started in the gas industry of either varying the bonus directly with the rate of dividend on capital or distributing as bonus a fixed percentage of the amount paid in such dividends—as distinct from the earlier practice of ascertaining the bonus by a percentage on wages varying inversely with the price charged for gas.

In the case of 56 schemes, of which full particulars are available, in public utility companies the average bonus for 1929 amounted to £8 15s. 9d. per head.

"Burn Less Gas."

The following humorous article appeared recently in an issue of the "Leamington Chronicle":

In "The Sunday Pictorial," Robert Magill indulges in "some random reflections" which have a great deal of point in them. After remarking that many industries urge the public to consume more of their particular products, this "laughing philosopher" continues: But not so the gas companies. They never buy full pages in the newspapers and smother them with "Burn more gas!" They never tell us how many microbes a cubic foot of gas will asphyxiate. They don't give away balloons so that we can squirt gas into them.

They just let you go on in your own sweet way, and they will even send a man to stop up any leak that might make you pay for any gas you hadn't used.

When you go to the showroom the first thing the salesman tells you about his wonderful gadgets is how little gas the things use. If you are renting an old gas stove, it is all you can do to prevent their coming round and taking it away by force, to replace it with something more economical.

"This fire," the man will say, "is one of our best. It burns only one foot an hour, and when it is hot it automatically turns itself out. That is our new meter. If you use too much gas it writes a letter to the company so that we can send a man down to remonstrate with you. But this—this is our masterpiece. We don't attach any pipes to it, so that it doesn't use any gas at all."

It is very curious. Can it be that they are afraid we shouldn't be able to pay our bills if they were too high?

Fresh Fruit for Ever.

[From the "Isle of Man Examiner."]

Time and time again within recent years, the Douglas Gas Light Company have given ample evidence of the initiative and enterprise which characterizes the management of this flourishing concern, and recently a series of fruit-preserving demonstrations, which were given in the Company's showrooms in Victoria Street, was but the latest instance of this same initiative and enterprise.

The demonstrations, which were the first of their kind ever given by a Gas Company in the north of England or the Isle of Man, were arranged in co-operation with the Manx Tree Planting Board of the Insular Government. The Board generously provided a quantity of apples raised in their nurseries at St. John's, and their object was to draw attention to the vast possibilities of fruit culture in the Island. The Gas Light Company had also arranged for a supply of Manx-grown plums, pears, grapes, and blackberries, as well as home-produced tomatoes, marrows, peas, beans, and mushrooms, the preserving demonstrations thus including vegetables as well as fruit.

The main window of the showrooms was appropriately dressed for the delivery of the lectures; and here again, the Company's enterprise in breaking away from the traditional "class-room kitchen" was most commendable. The impression of trees and a conservatory was most realistically conveyed, and the whole effect was very striking, while an ultra-modern touch was given by a microphone and loud speaker which was used to transmit the voice of the demonstrator to those watching and learning.

A Douglas young lady, Miss Kathleen Eason, N.T.S.C., lecturess to Radiation Ltd., was specially engaged to deliver the lectures, and in addition to her high and already well-known qualifications in the art of gas-cooking, she recently took a special course in fruit preserving at the Radiation laboratories in Birmingham. Miss Eason commenced her lectures at 11 o'clock each day.

The most essential thing for the successful preservation of fruit and vegetables is the maintenance of the correct temperature with the absolute minimum of variation. To achieve this is a difficult proposition with the ordinary type of gas-tap, but in the series of demonstrations Miss Eason used a "New World" cooker fitted with the "Regulo" control, thus ensuring the temperature of the oven, in which the fruit is heated for preservation, remaining constant. The "Regulo"-controlled cooker opens up a new vista for the housewife—an ap-

THE NEWS—continued.

propriate setting of the control and the cooking time required for different articles is detailed on a chart supplied with each cooker, and though we have specially referred to this cooker in its connection with the preservation of fruit and vegetables, it must not be thought that it is essentially a special cooker for this work.

Ten Thousand Paintings by School-Children.

More than 10,000 children competed this year in the painting section of the Annual "Fairy Gas" Competition organized by the British Commercial Gas Association, and many excellent pictures of the smoke-free "Sunshine City," exhibiting both skill and imagination, were sent in.

In addition to the paintings, 3000 juniors competed with a cross stitch design worked in coloured wools, and more than 4000 older girls and boys sent in essays on the advantages of using smokeless fuels (gas and gas coke). Two £50 scholarships form the first prize in the essay section, and these have been won by Kathleen Mary Reed, of Heywood, Lancs., and Hugh Kerr, of Coatbridge.

Gas Developments at Loughborough.

In opening, on Sept. 8, an exhibition of gas appliances at Loughborough, which was continued throughout the week and attracted large numbers of visitors, the Mayor (Councillor J. Pilsbury), directed attention to extensive developments which have been witnessed in recent years in the consumption of gas in the town. He expressed the hope that, as a result of the display arranged by the Municipal Committee, the number of consumers would be still further substantially increased.

Thirty years ago, he observed, there were 2900 consumers and 8600 gas cookers in use in the borough, while the quantity of gas manufactured was 60 million c.ft. To-day there were 7600 consumers and 6500 cookers in use and an output of 180 million c.ft.

Mr. W. M. Mason, Manager of the British Commercial Gas Association, said it was astonishing that so many people did not know what gas would do and were of opinion that other forms of lighting and heating were taking the place of gas. He could assure them that was not the case, mainly owing to the fact that modern gas was cheap, clean, and efficient and adaptable to cooking, heating, and lighting. In the London hospitals, nursing homes, and in Harley Street, the centre of the medical profession, there was more gas used per acre than anywhere else in the whole of the Metropolis, which showed that doctors and specialists considered it healthy.

Alderman L. James, Chairman of the Gas Committee, said they had been seriously affected by a considerable amount of opposition. They thought, however, that gas could hold its own under all sorts of competition.

Opposition to Sheffield Company's Proposed Order.

Strong opposition to the statutory notice and draft for a provisional order which is being promoted by the Sheffield Gas Company was raised at the monthly meeting of the Wath Urban Council on Sept. 9.

Mr. P. B. Nicholson proposed that the Council oppose the Order as strongly as possible, and send a resolution of protest to the Members of Parliament of the area asking for their co-operation. The powers asked by the Gas Company, which was a private one, he said, would allow enormous profits, and it was against the interests of the public that a monopoly for over ten years should be given the firm.

A great deal of just criticism had been directed against colliery companies making profits on coal through individuals after it had left the pit-head. The case of the Sheffield Gas Company was similar, and the Company's proposal to charge for that purpose 1d. per 1000 c.ft., would show a profit of £60,833 per annum.

That meant that Wath would have to pay between £500 and £600 per year through the Joint Gas Board. At the present time, continued Mr. Nicholson, the Sheffield Company had 8 million c.ft. of gas available per day over their contract. That amount was being wasted, and the Company should find a market for it before asking for these powers. He hardly thought the present Government would allow the Company to step in and take away some of the profits which had been distributed among the consumers.

Mr. J. A. Braithwaite, seconding, said he thought that a conference of all the authorities within a seven miles radius of Wath should be called to discuss the matter. He knew that other Councils had been asked to pass a similar resolution of protest, and were only awaiting a lead. A resolution from a joint conference would carry more weight.

The resolution was passed unanimously, and the Clerk was instructed to call a joint conference at an opportune time.

The Rotherham Corporation have also protested against any scheme which proposes to set up a body to control the purchase and supply of coke oven gas in their area on the grounds that it is against public policy and likely to increase the price of gas, while the Barnsley Town Council are not satisfied and have instructed the Town Clerk to prepare a report.

Corporation Undertakings' Results.

Chorley.

Alderman Heald, Chairman of the Gas Committee, reports that the results of the year's working have not proved as satisfactory as previously, due to reduced consumption by mills and manufacturing concerns. Expenditure accounted for £36,287, and income yielded £45,622, leaving a gross profit of £9335, against £11,560 last year. The balance disposable was £2675, against £5542. It was proposed to distribute the balance as follows: £1375 to depreciation fund; £505 to meet the cost of extensions; £275 cost of new meters; £430 transferred to suspense account, with no balance available in aid of rates. Although consumption was less by 6,877,000 c.ft., a recovery in trade would immediately bring back this reduction. Gas for domestic purposes showed an increase of 2½ million c.ft., and sales of gas appliances were also increasing. No increase in gas charges was contemplated.

(Unfortunately, this paragraph appeared last week under the heading "Blackburn." Readers will remember that we published Mr. G. P. Mitchell's report on the year's working of the latter undertaking in our issue for June 18 last.)

Colne.

The expenditure on revenue account was £47,294 and the income £59,737, the gross profit being £12,443. Interest on loans amounted to £2294 and sinking fund instalment £6358, a total of £8653, leaving a net profit of £3789. The coal carbonized was 12,701 tons, and in addition 634 tons of coke were used for gas making purposes in the latter plant. The quantity of gas made per ton of coal was 18,774 c.ft. compared with 19,224 c.ft. for 1929 and 19,690 c.ft. for 1928. The total quantity made was 250,370,000 c.ft.—a decrease of 2,429,000 c.ft. To a large extent bad trade is the cause of the fall, but not entirely. There is economy in gas consumption in the displacement of old cookers by those of a modern type, and as many of these have been installed in the district there has been a call for less gas. Residuals realized £5226 net, against £6276 in 1928-29. The number of consumers at the end of March, 1930, was 8793—3536 being ordinary meters and 5257 slot meters. Last year 3390 yards of cast-iron pipes were laid, the total mileage in the district of supply being now 53·54 miles. The number of public lamps lighted by gas at the end of March, 1930, was 1002—an increase of 69. Of these 1002 lamps, 660 are lighted by hand and 342 operated by controllers. The price of gas was reduced 2d. per thousand at the beginning of the December quarter, the price now in force being 3s. 10d. per thousand less a discount of 5 p.ct.

Dunfermline.

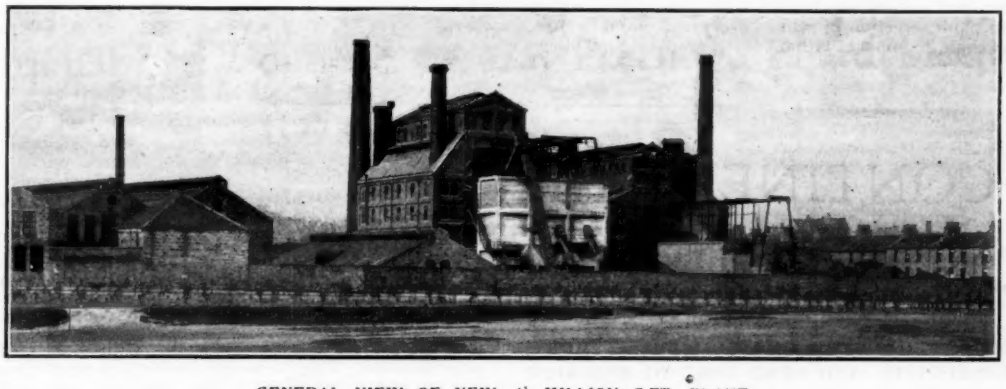
The expenditure on revenue account amounted to £50,746, and the income to £72,570, giving a gross profit of £21,823. After allowing for payment of interest and sinking fund charges, income-tax, expenses of management of consolidated loans fund, and stamp duty on mortgages, and taking credit for unemployment relief grants, there is a credit balance of £1093, which, deducted from the debit balance brought in, leaves a balance of £2449 to be carried forward against the current year. The coal carbonized during the year amounted to 20,450 tons, costing £18,480, an average of 18s. 0·87d. per ton delivered. The quantity of gas made as per station meter amounted to 362,229,000 c.ft.—an increase of 2,978,000 c.ft., equal to 0·85 p.ct. The amount of gas accounted for, however, shows an increase of 11,241,500 c.ft.—equal to 3·44 p.ct. The average yield of gas per ton of coal was 17,712 c.ft. as per station meter, or 17,945 c.ft. corrected, of an average calorific value of 430·9 B.Th.U., equal to a production of 77·32 therms per ton. The net income from residual products amounted to £11,341, equal to 11s. 1·09d. per ton of coal carbonized, or 61·37 p.ct. of the cost, making the net cost of coal 6s. 11·78d. per ton.

Leigh.

Alderman W. Grundy, Chairman of the Gas and Water Committee of the Leigh Town Council, at the meeting on Aug. 12, said that although Leigh had about the cheapest gas in the country, the ordinary consumer paying only 2s. 7d. per 1000 c.ft., there was a net profit on the year's working of £3352, while the consumption, despite the short-time working in the cotton trade, was over 8 million c.ft. They had also paid £10,000 out of the depreciation fund for a gasholder, and they were now proposing a further reduction of 2d. per thousand for those consumers who consumed 200,000 c.ft. This would apply to most bakers and to chip shops.

100,000 C.FT. PER FOOT RUN OF BENCH - - -

The Town Council of Aberdeen last week inspected a notable new installation of Woodall-Duckham verticals, and other gas-works extensions. They were shown the working details by Mr. Samuel Milne, the Engineer and Manager, and his Assistant, Mr. C. E. Smith. Sir Arthur Duckham was present as a guest.

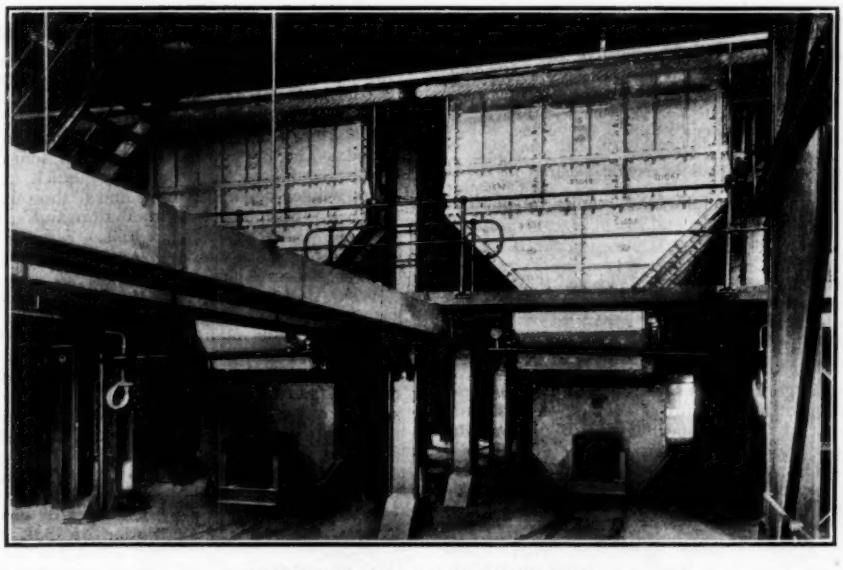


GENERAL VIEW OF NEW 4½ MILLION C.FT. PLANT.

Since the last extension of carbonizing plant, which took place in 1924, and cost £59,146, many other extensions and improvements have been carried out. In addition to new boosting plant, exhausters, and water-tube condensers, it was found necessary to carry out considerable extensions in 1928. This comprised two new vertical steam engines and exhausters, a Livesey washer, a mechanical scrubber-washer, four new purifiers (each 40 ft. by 35 ft. by 6 ft.), and a station meter of a new and improved type. This plant is capable of dealing with a further production of over 3 millions per 24 hours.

A short description of the purifying plant may be of interest. There is an underground tank of reinforced concrete, capable of holding about 250,000 gallons of tar, equivalent to 6 weeks' maximum production. Concrete piers are carried up to the ground level, and form bases for the steel stanchions which support the entire building and purifying plant. The roof of the underground tank forms the ground floor, on to which the spent oxide is discharged direct from the bottom of the purifiers. The second floor carries the four cast-iron purifiers, with their gas connections, all of which are visible and easily accessible. The top floor is used for storage and revivification, and is provided with circular openings and canvas chutes. There is an electric hoist at each end of the building. The exhauster house is of brick, and was constructed entirely by Gas Department workmen. The total cost of the extension amounted to £26,000.

In December, 1928, it was necessary to increase the carbonizing plant, and a contract was entered into with the Woodall-Duckham Company, Ltd., who had already built two installations of continuous verticals—the first in 1913, and the second in 1924. The new plant contains 28 retorts of the latest and largest type. Each retort is capable of carbonizing 11 tons of coal per 24 hours, or a total daily capacity of 308 tons, equivalent to about 4½ million c.ft. of gas. This plant displaced 14 beds each of eight horizontal retorts, capable of producing 1½ millions per 24 hours, and occupying 10,080 sq. ft. of ground area. The new vertical bench, producing three times as much gas, occupies only 7607 sq. ft.; the remaining space being taken up by reinforced concrete hoppers capable of taking 500 tons of coke and 50 tons of breeze.



BOTTOM CASTINGS AND DISCHARGE.

Retorts carbonize 11 tons a day each; 100,000 c.ft. of gas produced per foot length of retort bench.

The battery of six producers is on the ground floor, and there are two waste-heat boilers. The latter are capable of supplying the steam requirements of the entire works.

The coal handling plant consists of four hydraulic wagon tippers, capable of up-ending wagons of 20 tons gross weight when working at a hydraulic pressure of 1000 lbs. per sq. in. The coal is tipped into receiving hoppers and is then delivered by revolving feeder plates on to a push-plate conveyor, from

which, if required, it can be passed through a coal breaker, or delivered direct to a gravity bucket conveyor which elevates it to the coal storage hoppers 77 ft. above ground level. At this point a tipping tray conveyor distributes the coal into the overhead storage hoppers as required. The coal breaker and all the conveyors mentioned have a capacity of 75 tons of coal per hour, and the coal storage hoppers are capable of holding 48 hours' coal supply for the retorts—that is, about 620 tons.

The coke handling plant consists of two electrically propelled coke chassis running on narrow gauge rails for conveying the coke to the lifting point outside the retort house, where an electric telpher raises the skip and automatically discharges it into the 500-ton capacity reinforced concrete hoppers. From these hoppers the coke passes through discharging doors over wire-mesh screens, and is filled into bags.

The entire plant, erection of which was commenced in July, 1929, is remarkably compact, without being crowded, and shows a distinct advance in the design of modern carbonizing plant. Ground space is a most important consideration in the Aberdeen Gas-Works, and all the extensions during the past have been made with a view to conserving ground area to the greatest possible extent.

To show the developments and improvements made in this direction, the following figures may be of interest:

Date.	No. of Retorts.	Tons per Retort per 24 Hours.	Total Tons Carbonized per 24 Hours.	Area of House. Sq. Ft.	Area per Ton of Coal Carbonized. Sq. Ft.	Total Gas Produced per 24 Hours. C.Ft.	Total Cost.
							£
1913 .	20	5	100	3456	34·56	1,250,000	19,307
1924 .	24	8	192	5928	30·87	2,784,000	59,146
1930 .	28	11	308	7607	24·69	4,466,000	93,670

IN CONTINENTAL COUNTRIES - - -

Abstract Translations from the Technical Press of France and Germany.

SIMULTANEOUS PRODUCTION OF LIQUID FUELS, SMOKELESS BRIQUETTES, AND LUMP COKE OF SUPERIOR QUALITY.

L. Vertu, "Chimie et Industrie," 1930, **24**, 27, distils a mixture of crushed coal with low-grade heavy oils, naphthas, shale oil, heavy crude petroleum, &c. Since the oil is finely disseminated through the coal mass, rapid distillation and cracking are facilitated, the coal affording a large heating and evaporating surface. Furthermore, the asphaltic and bituminous constituents of the oil remain behind and serve as a binder for coke formation. The distillates obtained from the coal serve to augment the yield of liquid products.

300 grammes of anthracite powder (V.M. 2·25 p.ct.) and 300 grammes of low-volatile coal (V.M. 13·52 p.ct.) were mixed with 105 grammes of mineral oil (sp.gr. 0·910 at 15° C.) and the mixture was briquetted and carbonized. The volume of distillate oil was 99 c.c. and the oil distilled as follows:

Fraction, °C.	63.	63-100.	100-150.	150-200.	200-225.	225-300.	300-325.	Residue at 325 (by diff.)
P.ct. by vol.	I.B.P.	3·45	4·3	7·3	12·0	27·2	23·4	22·35
Sp. gr. . .	..	0·790		0·813	0·838	0·874	0·885	..

Specific gravity of total distillate to 325° C. = 0·858.

The mineral oil used gave the following results on distillation:

Fraction, °C.	100.	100-225.	100-250.	100-350.	Residue at 350 (by diff.).
P.ct. by vol. . .	I.B.P.	2·6	11·6	20·2	79·8
Sp. gr. . . .	..	0·890	0·857	0·795	..

The production of large quantities of volatile distillates as a result of carbonization of the mixture is evident. As regards the mineral oil itself, the fall in specific gravity during the course of distillation indicates decomposition. The solid residue from the middle portion of the retort (temperature 400° C.) was in the form of a semi-coke, while that from the lower portion (temperature 650° C.) was a very hard coke of good appearance.

Similarly, a very heavy Persian petroleum from Patos (sp.gr. varying between 0·990 and 1·08) which is almost impossible to distil, and hence had not been able to be exploited, yielded satisfactory results as follows:

Fraction, °C.	56.	56-120.	120-150.	150-200	200-250.	250-300.	Residue at 300 (by diff.).
P.ct. by vol. .	I.B.P.	3·5	5·3	11·4	12·2	17·1	50·5

The specific gravity of the crude petroleum used was 1·08 and that of the product 0·918.

On the basis of these results it was deemed that exploitation of the petroleum could be undertaken.

The oils boiling below 150° C. were removed by topping, and the remainder of the product was again mixed with coal and the process repeated, whereby a distillate of sp.gr. 0·910 was obtained. This yielded a further 5 p.ct. of low-boiling oils coming over below 150° C. The procedure was again repeated, and yielded a product of specific gravity 0·900 giving a further 5·7 p.ct. of low-boiling oils. Hence, in all, 19·5 p.ct. of products boiling below 150° C. was obtained.

The fact that the distillation has to be repeated is stated to be not only not a drawback, but, on the contrary, an advantage, since the carbonization is carried out with the aid of the gases produced, and each operation gives rise to a lump coke having a value more than twice that of the powdered coal employed. The process is said to be the only one worked out for the treatment of very heavy crudes with production of important yields of petrol.

The advantages of the process are said to be twofold, in that it gives rise, on the one hand, to petrol, fuel oil, and lubricating oils, and, on the other hand, to a smokeless solid fuel.

THE EMERGENCY SERVICE OF THE MUNICH GAS-WORKS.

The organization of the emergency service of the Munich Gas-Works is described with illustrations and charts by T. von Gässler in Das Gas- und Wasserfach 1930, **73**, 847-853 (Sept. 6).

The essential feature of such a service should be instant availability. A central office with a day and night staff is maintained. The personnel must have a lengthy experience, iron nerves, coolness, ability to make quick decisions, good judgment, a keen sense of smell, and a thorough knowledge of the network. Sleeping accommodation and sitting rooms are provided for the staff, and a wireless receiver for their entertainment. Recorders showing the content of the holders and the district pressures are installed.

A car park containing 15 breakdown cars, 1 mains repair lorry, 1 meter lorry, and 3 motor cycles is maintained. A cabinet contains plans of all the streets, showing the services and mains, and this enables faults to be traced immediately.

The breakdown cars are fully equipped with blowing out tackle, ladders, spare meters, bandages, tetralin, tools for special requirements, buckets, safety lamps with long leads, handlamps, hose, and CO-masks. The mains repair lorry is provided with drilling, breaking, and lifting tackle and seating accommodation for six men. It contains also a battery driven head light for use in dark situations. For special cases, accessory equipment—*e.g.*, various types of gas leak detectors and exhaust fans for the ventilation of shafts and spaces—is also available.

A first-aid room, fully equipped with oxygen apparatus, rescue appliances, lobelin, &c., and having a staff expert in rescue work and in the administration of lobelin is maintained.

The town is divided into 14 breakdown areas, to each of which is allocated one car, one fitter, and one mate. The mains repair gang include in their duties the warning of the inhabitants, the extinguishing of fires in hearths, the ventilation of dwellings, the opening up of locked premises with the help of the police, the removal of injured persons, and, finally, the repair of the break as quickly as possible.

A comprehensive card-index of all breakdowns and complaints is kept, and is classified according to defects, districts, &c. By this means it is possible to trace districts in which complaints are excessive, due to worn out services, and to arrange for the necessary replacement work. A complete

record is kept of the nature of all complaints under 84 headings. The minuteness of the classification may be illustrated by the headings relating to meters—corroded, not registering, lacking water or overfilled, defective brackets, not passing gas, frozen, meter too small, drum out of its bearings, coin feed jammed. Photographs of the charts employed are reproduced in the paper.

The district served contains 730,000 inhabitants, and there are 183,000 meters. In 1929 there were 57,635 complaints, and the total cost of the emergency service was £10,500, representing 3s. 8d. per complaint, equivalent to 1s. 2d. per meter, or 3½d. per inhabitant. A small part of this is covered by charges which are made in cases in which this is justifiable, the net cost being thus reduced to 3s. 2d. per complaint.

This is a cost which can well be borne by the undertaking, since it results in well satisfied consumers.

One point brought out by the records is the reduction in the number of complaints when wet meters were replaced by dry meters. Naphthalene complaints have been reduced since the adoption of tetralin spraying.

The entire organization has as its object service to the consumer. Additional work undertaken is a constant look-out for leakages in the distribution system and the inspection of appliances and flues.

National Gas Council—Central Executive Board Meeting

A meeting of the Central Executive Board was held at 28, Grosvenor Gardens, S.W. 1, on Tuesday, Sept. 9, 1930, at 2.30 p.m. In the absence of Sir David Milne-Watson, the Chair was taken by Mr. WILLIAM CASH (Vice-Chairman).

Before proceeding with the business of the meeting, the Chairman reported with deep regret the death of Mr. E. P. Vince, late Engineer and Manager of the Minehead Gas Undertaking, and a vote of sympathy with his relatives was passed, all standing.

RESIGNATION OF MR. W. E. CATON.

It was reported that Mr. P. N. Langford would represent the Midland District Executive Board on the Central Executive Board, vice Mr. W. E. Caton (resigned).

GAS LEGISLATION.

It was reported that on July 31 a deputation from the National Joint Industrial Council for the Gas Industry had waited upon Mr. Wm. Graham (President of the Board of Trade). The deputation had been introduced by Mr. Will Thorne, M.P., who had drawn attention to the conditions which existed when Parliament legislated for the gas industry in 1847 and 1871, and had emphasized the necessity for immediate amendment of the existing antiquated legislation.

Sir David Milne-Watson had put the case for the removal of restrictions, and for the greater freedom of gas undertakings, dealing particularly with the question of gas charges. His statements had been ably backed up by Mr. Arthur Hayday, M.P., who had made it clear that the workers were in agreement with the employers as to the necessity for new legislation being introduced at the earliest possible moment.

COAL MINES ACT.

It was stated that the Bill had received the Royal Assent at the close of the Parliamentary Session, and that on August 1 a letter had been received from the Ministry of Mines with reference to the appointment of Industrial Consumers' representatives on Committees of Investigation under the Coal Mines Act, 1930. The Central Executive Board agreed that endeavours should be made to ensure that the gas industry should have direct representation on certain of these Committees of Investigation.

VENTILATION OF ROOMS WITH GAS-HEATED APPARATUS.

It was reported that the Officers of the Council had had an interview with Officials at the Ministry of Health with regard to a circular which the latter had issued to Local Authorities drawing their attention to recommendation 6 of the Report of the Departmental Committee on Gas Poisoning and explaining the limitations placed upon them by the existing law in regard to the making of by-laws to give effect to this recommendation.

The matter was referred to the Gas Safety Committee of the Council.

RIVER POLLUTION.

It was reported that the Joint Advisory Committee on River Pollution set up by the Ministry of Health and the Ministry of Agriculture and Fisheries had now published their Second Report. It was agreed to incorporate a summary of the recommendations in the Council's Reports.

DEVELOPMENT OF LARGE-SCALE GAS SUPPLY FOR COMMERCIAL AND INDUSTRIAL USES.

It was reported that the Joint Committee consisting of three representatives each from the Institution of Gas Engineers, the British Commercial Gas Association, and the National Gas Council had met on July 22, and that the meeting had resulted in a useful discussion of the various problems involved. A further meeting was to be held towards the end of the month, which representatives of large industrial gas undertakings were to be invited to attend.

RATING ASSESSMENT.

It was reported that the case considered at the last meeting of the Board, where the Assessment Committee had departed from the orthodox method of valuing a gas undertaking, had been carefully considered by the Council's Rating Committee, and that the conclusion had been reached that the case did not constitute a suitable one for the Council to contest on a question of principle.

UNEMPLOYMENT GRANTS COMMITTEE.

It was reported that, as a result of the inquiry into the application by the South Shields Corporation for assistance in a scheme involving the conversion of the public lighting from gas to electricity, in which the Council had taken an active part in supporting the Gas Company in an appeal against the scheme, the Ministry of Health had now refused the application of the Corporation, and no assistance would be given by the Unemployment Grants Committee to the conversion of the public lamp standards to electricity in the Borough of South Shields.

GAS PRODUCTION STATISTICS.

The Board agreed to comply with a request received from the Bank of England that periodical statistics relating to the production of gas should be supplied to the Bank as soon as possible after the period to which the statistics relate.

Notes on New Books.

INTRODUCTION TO THE TECHNICAL TREATMENT OF GASES.*

The book does not claim to be a comprehensive treatise but merely an introduction. As such, the treatment is naturally brief though a wide range of topics is discussed. The arrangement is very systematic and this is particularly noticeable in the sections dealing with the manufacture of gases. In this connection the author deals with the following cases: Manufacture of gases from gases (*e.g.*, synthetic ammonia); from liquids (*e.g.*, pyrolysis and fermentation); from solids (*e.g.*, carbonization); from gases *plus* liquids (*e.g.*, air gas); from gases *plus* solids (*e.g.*, producer gas); and from liquids *plus* solids (*e.g.*, acetylene). Electrical methods are also discussed. The sections dealing with gaseous fuels, though short from the point of view of the gas engineer, nevertheless occupy an important proportion of the contents.

Other subjects dealt with are the heating, cooling, compression, and liquefaction of gases, the isolation of natural gases and their separation, the cleaning of gases, dust and fog removal by dry, wet, and electrostatic methods, purification, dehydration, storage, and distribution. Methods available for the measurement of temperature, pressure, specific gravity, volume, velocity, and calorific value are described, and a section is devoted to methods of analysis. A useful nomogram for obtaining the humidity of gases from the wet and dry bulb readings is given.

As far as it goes, the treatment is generally quite up-to-date. Thus waterless holders and the explosion calorimeter are described. The section on temperature measurement is, however, rather disappointing. An important feature which serves to compensate for the fact that the book is merely an introduction is the inclusion of an extensive bibliography at the end of each section with references both to books as well as to important articles in the Technical Press. The fact that the book bears the imprimatur of Julius Springer is sufficient to indicate that it has been well produced.

* "Einführung in die technische Behandlung gasförmige Stoffe," by W. Bertelsmann and F. Schuster. [Berlin, 1930, Julius Springer. Pp. X. + 412. Price, RM. 38 unbound, RM. 40 bound.]

THE "JOURNAL" TECHNICAL RECORD

Which also contains Full Reports of Meetings of Gas and Allied Associations ———

North British Association of Gas Managers

ANNUAL MEETING IN ABERDEEN

The Sixty-Ninth Annual General Meeting of the North British Association of Gas Managers was held in Cowdray Hall, Schoolhill, Aberdeen, on Thursday, Sept. 11. Mr. DAVID FULTON, of Helensburgh (the President), occupied the chair, and the attendance when the proceedings opened was considerably above the average. Among those accompanying the President on the platform were Sir Arthur Duckham, G.B.E., K.C.B., the William Young Memorial Lecturer for the day; Mr. J. R. W. Alexander, Secretary of the Institution of Gas Engineers; Mr. H. G. Ritchie, Falkirk, President-Elect of the Association; Mr. J. W. Napier, Alloa; Mr. Sam Milne, Aberdeen; and Mr. Archibald Kellock, Secretary and Treasurer.

In the absence of Lord Provost Rust, who had been commanded to attend the Royal Highland gathering at Braemar, the civic deputation from the City and Corporation of Aberdeen comprised Bailie Corry (Senior Magistrate), Councillor Catto (Convener of the Gas Committee), and Mr. G. S. Fraser (Town Clerk).

The PRESIDENT, in the course of his introductory remarks, said he regarded it as a compliment to Aberdeen and himself—particularly to Aberdeen—that so many Scottish Managers were present. So far as Scotland was concerned, he believed he was correct in saying that the representation ranged from Kirkwall in the North to Stranraer in the South. In addition, there were with them many friends from across the Border.

GAS SUPPLY IN ABERDEEN.

Bailie CORRY then extended to the members a hearty welcome. As a Corporation, they felt honoured in that the Association had selected Aberdeen as the venue of the annual meeting. They regretted that the Association had been so long in returning to the city, because he had been told that an interval of 18 years had elapsed since the last visit was paid. In the years that had intervened, the members might be interested to hear that the Corporation of Aberdeen had spent a great deal of money, time, and thought in beautifying the city, and because of that he felt confident the Association would not be so long in paying their next visit. He believed it was one of the best managed cities in Scotland, while industrially it was the one bright spot.

Gas was first introduced into the district in 1824, through the agency of a private Company, who sold it at between 40s. and 50s. per 1000 c.ft. The venture proved so remunerative to the Company that in 1844 a rival Company came into being, and opposition was carried on for two years; but at the end of that time the Companies came to an agreement to amalgamate. In 1871 the undertaking was transferred to the Town Council, and from that date there had been progress and development. In that year the price of gas was 5s. 5d. per 1000 c.ft., and at the present time the maximum was 2s. 3d. It seemed to him that if they took into consideration the long distance Aberdeen was from the coalfields, they would agree that what had been accomplished was a remarkably good achievement. As practical men, they would realize that the progressive reduction which had been effected was due to two causes—the acquisition of the latest machinery, and the efficient management of the Corporation, and more especially the head of the department. [Applause.] Their latest plant had been recently installed, and according to the estimate of their Gas Engineer, it would bring them within the category of the most fully-equipped gas undertakings in Scotland.

Personally, he was a believer in conferences, and felt that the present one would be of benefit to all associated with it. Of course, in every Town Council or similar body there were some men of little faith who argued that conferences of this nature were useless. From his own experience as a Convener, however, he knew the advantages of such conferences, and was well aware that in many instances thousands of pounds had been saved because of them.

The PRESIDENT, in acknowledgment, said there was a sort of legend that Aberdonians were "a wee bit near." He was altogether opposed to that belief, because he had never experienced anything but the height of hospitality in Aberdeen. The functions associated with the present year's annual meeting of the Association all showed that hospitality was the dominating note of the city. Reference had been made by Bailie Corry to the wonderful prosperity of the Gas Department. At the present moment Aberdeen was selling gas at 2s. 3d. per 1000 c.ft., which he believed was equal to 5·6d. per therm. If that were so, then he thought it was the cheapest gas in Scotland. The fact that gas was being sold at such a low figure was a tribute to the Engineer, Mr. Samuel Milne. That the gatherings in connection with this annual meeting were likely to be a great success was undoubted, but he would like to say that a great deal of the enjoyment to be derived was due to Mr. Milne and the splendid efforts he had made on their behalf. The Association, at least so far as the present year was concerned, was fortunate in that Mr. Milne was so honoured and highly regarded in the city where he worked.

ABSENTEES.

A number of apologies for absence had been received—including one from Mr. H. E. Copp, the President of the Institution of Gas Engineers.

The following cable was addressed to the President from New York:

> Best wishes successful conference. Happy conclusion to useful year in office. From your friend,
>
> JOHN MCLUSKY.

ANNUAL REPORT.

The PRESIDENT directed the attention of the members to the annual report, with its accompanying statement of accounts. A feeling had been expressed on one or two occasions during the last two or three years that the subscription might be reduced. This was a point, added the President, that had been gone into very carefully, and members would see what was proposed by way of a reduction. If the proposals of the Council were given effect to, he had only to add that the modifications and readjustments as to subscription fees would take effect at the beginning of the next financial year.

Passing to the Education Scheme of the Institution of Gas Engineers, the President pointed out that, so far as the candidates from Scotland were concerned, they were increasing slowly. He appealed to members to do what they could to stimulate interest in these examinations. If managers would only do what they could to encourage suitable men in their employment to go forward as candidates, everything would be well.

Mr. J. K. FRAZER (Dalmarnock) said he felt it would have been much better if the Council had taken its courage in both hands and recommended that the subscription fee should be a uniform one throughout. He did not know of any technical or professional body like the North British Association where the same spirit of differentiation as was suggested had crept in. He was quite sure that if the position was reasonably put to the managers of smaller undertakings they would be quite willing to agree to a subscription of one guinea, on the understanding that uniform rights and privileges were being enjoyed.

The PRESIDENT agreed that there was some force in the point advocated by Mr. Frazer. The difficulty was that since the Association was formed a differentiation of some kind or another had always been made in the rates of subscription. This was a precedent which it would be difficult to break down. He took it that the motion proposed by Mr. Frazer was that that portion of the Council's report referring to rates of subscription should be remitted back for further consideration.

Mr. W. WILLIAMSON (Forres), in seconding, proceeded to develop an argument that uniformity of subscription fee might have tended towards a more satisfactory building up of the Benevolent Fund.

Mr. R. W. COWIE (Hawick) pointed out that the managers of the smaller undertakings were expected to pay their own subscriptions. The same condition of things did not obtain

so far as the larger undertakings were concerned. If Mr. Frazer's amendment meant the complete cancellation of the whole of the recommendations of the Council then, although one held strong views on particular points, he would support the Council.

Mr. G. BRUCE (St. Andrews) said he objected to any member stressing the point of the smaller works. They were most anxious to keep the smaller works within the ranks of the Association, and if the normal subscription was one that was too high it would be a wise policy to encourage differentiation. It seemed to him that what was proposed by the Council was entirely in the interests of the whole Association.

The PRESIDENT said he was prepared to concede that a rather good point had been made by his friend, Mr. Frazer; but, on the other hand, the one dominating factor against it was that of history. It might be thought that under the existing arrangement the Association was getting too much money, but in these days there was a real use for the money. If the members knew of any Association with which they were connected that gave better value for the subscription paid than the North British Association, then they were very fortunate indeed.

The amendment received only three votes, and was therefore defeated by a large majority.

Mr. W. WILLIAMSON, at the request of the President, renewed his argument for greater stability in the Benevolent Fund. He concluded by proposing that the entrance fee of all extraordinary members should for the future be earmarked for the Benevolent Fund of the Association.

The PRESIDENT said that his experience of the work of the Council extended over ten years, and during this time every case before them, so far as it had a bearing on the Benevolent Fund, had been dealt with sympathetically, and often generously. In the meantime, at any rate, he saw no particular reason for an alteration in the allocation of the income of the Association.

Mr. DAVID VASS (Perth) said he was prepared to second the amendment put forward by Mr. Williamson. He was not disposed to go altogether the length Mr. Williamson suggested, but he had the feeling that this was a subject that ought to be further considered by the Council.

Following some further discussion, the proposal was put forward that the point raised by Mr. Williamson should be considered by the Council and reported upon by them.

The report and financial statement were then adopted.

NEW MEMBERS.

The PRESIDENT explained that in the annual report there would be found a list of new members whom the Council recommended for election. Since the publication of that report, however, there had been received nominations in favour of the following: Messrs. James Blair, Cove; Archibald D. Conbrough, Inverbervie; Robert Dodds, Leslie; J. S. Ednie, Biggar; Thomas Gourlay, Kirkwall; Sinclair Manson, Wick; Wm. Marshall, Largs; J. S. M'Gill, Slamannan; Gordon M'Nair, Huntly; and J. A. Robertson, Alva.

Transferred from Associate to Ordinary Membership.—Robert Stewart, Auchterarder.

The meeting unanimously approved of these additions.

PRESENTATION OF CERTIFICATES.

The PRESIDENT said it had been intended to present the education certificates to those candidates who had been successful in the examinations; but, unfortunately, the certificates had not arrived. He believed there was a feeling in the minds of members that rather too long an interval interposed between the examination and the announcement of the results, but the circumstances of the present year were exceptional. The expectation was that next year the results would be to hand much more promptly. For the past year the winners of certificates were as follows:

Higher Grade Certificates, Internal Candidates (G.E.—Gas Engineering; G.S.—Gas Supply).—James Storrier, 88, Woodside Terrace, Dundee, G.E. (Second Class); Wm. Nicol Baird, 38, Cambridge Avenue, Edinburgh, G.S. (First Class); Wm. Ramage, 63, Halbeath Road, Dunfermline, G.S. (Second Class); Alex. C. Rea, 18, Cowan Road, Edinburgh, G.E. (First Class); Frank G. Symon, 11, McKinlay Street, Glasgow, G.E. (First Class); Kenneth E. Graham, 2, Windsor Terrace, Glasgow (Second Class).

External Candidates.—Thomas Monear Duncan, Gas-Works, Friartown, Perth, G.E. (First Class); Wm. Stewart Johnston, Revelston, 93, Pithard Road, Dundee, G.E. (First Class).

It was, the President continued, highly gratifying that so many Frst-Class Certificates had been secured by Scottish students. In that connection he believed he was correct in saying that the only First-Class Diploma awarded went to a Scottish student. [Applause.] It was up to the seniors to ensure that juniors took advantage in these classes in increasing numbers.

WILLIAM YOUNG MEMORIAL LECTURE.

The PRESIDENT, in introducing the William Young Memorial lecturer for the day, Sir Arthur McD. Duckham, G.B.E., K.C.B., reminded the members that this lecture was instituted some years ago, and had been delivered by both scientific and practical men. In asking Sir Arthur Duckham to follow on, it was felt that the traditions and prestige of the lecture were being fully maintained. Sir Arthur was distinguished, not only for his great work for the gas industry, but for his splendid services to the nation. Sir Arthur had sacrificed a portion of his holiday to come to Aberdeen to deliver this lecture.

Sir ARTHUR DUCKHAM, who was received with applause, remarked that the President, in inviting him to be the William Young Memorial Lecturer, had gone away from a recognition of the usual scientist and gentleman of research. He had gone to one who could not claim to be anything more than an industrialist. [Sir Arthur then proceeded to deliver the lecture which follows this report.]

The PRESIDENT remarked that no excuse was necessary from him for for suggesting the name of Sir Arthur as the William Young Memorial Lecturer. He was a believer in what might be called the practical lecturer, because most of them were likely to derive something that would be beneficial to them in the course of their daily work.

WILLIAM YOUNG'S WORK.

Mr. J. W. NAPIER (Alloa) said the literature of the Association had been enriched as a result of the practical and scientific paper they had just heard from Sir Arthur Duckham. Sir Arthur was properly looked upon as the politician, the statesman, and the Cabinet Minister of the gas industry. He had projected his individuality into the affairs of the gas industry in a manner that, apart from the great honour that had been conferred upon him, made him an asset that the industry was not likely to forget. Personally he did feel that the Gas Managers of Scotland had been very fortunate in having influenced Sir Arthur Duckham to take an interest in their affairs and work. It was something like 20 years ago, proceeded Mr. Napier, since the William Young Memorial Lecture was first instituted, and at the present stage he felt that something was necessary by way of review. Incidentally, it was of interest to observe the bond of association between Sir Arthur Duckham, who started in the retort house, and William Young, who started his apprenticeship as a gasfitter in Dalkeith under the tuition of Alexander Bell, junior. How different, however, observed the speaker, had been the paths of these great men. William Young was a man who was determined to put science into the practice of the distillation of coal so as to make things better for the world. He (Mr. Napier) found on a reference to the book published by Dr. Alfred Daniell, M.A., LL.B., D.Sc., F.R.S.E. (Advocate and Barrister-at-Law), in the year 1911, that the papers contributed by William Young from the year 1874 to 1903 numbered 18. The first paper was contributed by him in 1874 before the West of Scotland Association of Gas Managers and was entitled "The Absorption of the Illuminating Constituents in Coal Gas by Heavy Hydro-Carbons." Today there had arisen a new generation who, in the absence of the personal touch, did not realize the greatness of the individual and the scientist that William Young really was. Accordingly, by way of making them better acquainted with the men and the subjects of which he was capable of treating, he proposed to run over in somewhat rapid sequence some of the papers which William Young contributed to the Associations of his time. These were: "The Condensation of Crude Gases" (1875); "The Utilization of the Gas Resulting from the Destructive Distillation of Shale in the Manufacture of Paraffin Oil" (1876); "The Causes Affecting the Quantity of Carbon Deposited in Retorts" (1877); "Notes on Some of the Physico-Chemical Laws Relating to Gas" (1878); "The Elimination of Sulphur Compounds from Illuminating Gas" (1879); "The Proportion of Carbon Present in Gas in Relation to the Illuminating Power" (1879); "Jottings on the Principles Involved in Gas Manufacture" (1880); "The Fractional Distillation of Coal in Connection with Gas Manufacture" (1882); "Further Notes on the Fractional Destructive Distillation of Coal for the Recovery of Bye-Products in Connection with Gas Manufacture" (1883); "Purification in Close Vessels and Avoidance of Nuisance in the Manufacture of Coal Gas" (1887); "The Principles of the Production of Illuminating Gas from Liquid Hydro-Carbons" (1893); "Further Development of the Peebles Process" (1894); "Notes on the Chemical Constitution of Illuminating Gas, and on Some of the Physico-Chemical conditions which Influence the Luminosity of Gas Flames" (1895); "The Permanency of Illuminating Gas" (1896); "Naphthalene from Retort to Point of Deposition" (1900); "Jottings on the Principles Involved in the Production of Gas by Different Processes, and their Relative Values" (1900); "Gasification of Bituminous Coals" (1902, in Collaboration with Messrs. Samuel Glover and Thomas Glover); and "Further Suggestion for the Elimination of Naphthalene from Coal Gas" (1902, in collaboration with Mr. Thomas Glover).

Proceeding, Mr. Napier explained that the last paper read by William Young, of which there was any record, was in 1903, when the subject he chose for his treatise was: "Remarks Upon the Principles Involved in the Production of Gases from

Coal, and Suggestions as to their Application in Future Developments."

Some Expressions of Dr. Daniell.

Dr. Daniell, in his book, "William Young: An Appreciation," gave them an interesting picture of William Young and described him as follows:

> As a student of nature I think he was very much the type of man that Michael Faraday was, with the same humility of personal bearing towards the foundation truths which he always earnestly desired to understand, and with the same mental power of vividly visualizing his conceptions. He had the same defect as Faraday, too—the want of the mathematical turn of mind. But he had Faraday's great gift, the gift of clear and interesting exposition; he made you see clearly what it was that he clearly saw in his own mind. And when he was roused to explain things to you as he saw them, I have often been struck by the exceeding likeness of his bearing and expression to those of James Clerk Maxwell—the same intentions, the same kindling of the eye, the same swing back of the head, the same obvious desire to understand the "go of things," and in its degree the same instinctive direct rightness of thought, and, may I add, the same sense of humour, and the same candour and limpid sincerity of character.

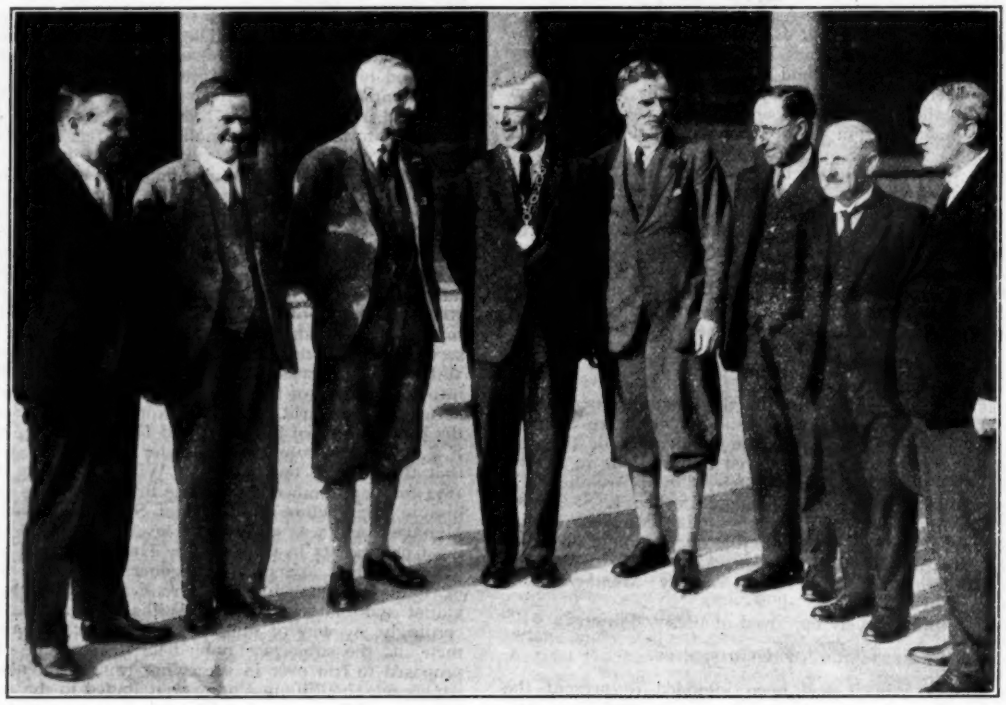
In the book already referred to, Dr. Daniell also touched upon the personality of William Young, and in that connection he said this:

> It may be perhaps less easy for those who come after us to understand the immense impression produced by Mr. Young during his long life of activity upon those who came in contact with him, or the reasons which have made it seem none other than an act of filial piety to take due steps to keep his name in remembrance. They will not know the outstanding personality, the striking figure, big, erect, strong-looking, with muscles taut and faculties all braced up, hair very white at top, massively rising above a square brow, full beard of dark brown for many a year, but later of patriarchal hue, dark, piercing eyes that looked straight at one and through one, but with a kindly and almost a shy glance, and an unassuming willingness to see all the good that was in one.

That William Young was alive to the changes that were being effected in his own time was fully borne out by the following extract from the admirable work by Dr. Daniell:

> Mr. Young's last paper to an Association was that sent by him, appropriately, to the North British Association in 1903, entitled "Remarks Upon the Principles Involved in the Production of Gases from Coal, and suggestions as to their application in future developments." This paper has no special bearing on the problems of condensation. It is directed to the possibilities of the then future in the arrangement of carbonization so as to produce much ammonia, a large volume of gas in which the principal value would be primarily in the heating power, and in the utilization, towards such enrichment as might be needful, and the tars obtained. . . . But we may observe here that this, the last paper of a long series, shows all the intentness of the early papers, the same youthful grasp of the possibilities of the future, with the added breadth of view derived from ripe experience. The ideals and aims of his earlier days, the production of good gas for flame illumination, were all being displaced by the newer requirements and conditions.

Continuing, Mr. Napier remarked that so far as the William Young Memorial Lecture for that day was concerned, Sir Arthur Duckham had concentrated within its compass what was akin to the story of his life's work. Personally, he (the speaker) had been at a conference in Edinburgh on the previous day when the subject of low-temperature carbonization of coal entered very largely into the discussion. It would be noticed, however, that in his lecture that day, Sir Arthur Duckham made no mention at all of the subject of low-temperature carbonization in his paper; and from that he concluded that the lecturer did not consider the subject to be one of economic value. Unless Sir Arthur was feeling along the lines just indicated it was not possible to conceive of him neglecting a reference to the subject of low-temperature carbonization which for the last few years had so considerably dominated the public mind.



[By courtesy "Press and Journal," Aberdeen.

SOME OF THE DELEGATES SNAPPED AT GORDON'S COLLEGE.

They are (left to right): Messrs. J. R. W. Alexander, Secretary, Institution of Gas Engineers; A. Kellock, Airdrie, Secretary, North British Association of Gas Managers; H. G. Ritchie, President-Elect; D. Fulton, Helensburgh, President; T. W. Harper, Ayr, Senior Vice-President; G. Bruce, St. Andrews, Member of Council; L. Bain, Cullen, Member of Council; and J. W. Napier, Alloa, Past-President.

Sir Arthur's Acknowledgment.

In acknowledging the vote of thanks, Sir Arthur Duckham said that Mr. Napier had been of infinite help to him on many subjects upon which they appeared to have a common interest. The conversations they had had together on matters associated with the gas and kindred industries had been, he hoped, of mutual benefit, and certainly he had benefited from an exchange of views and opinions from Mr. Napier. So far as low-temperature carbonization plant was concerned, his firm had been associated with the building and manufacture of one such undertaking. Personally, he did not wish to embark upon another for the reason that quite obviously there was no money in it. It had been worth his while, he thought, to break up his holiday in the South of France in order to come among them and deliver the present lecture that had been another red-letter day in his life, because he appreciated the enthusiasm of the members of the North British Association of Gas Managers.

When he returned to the Pyrenees, as he hoped to do in the course of a few days, he would recall with pleasure the cordiality of the reception that had been extended to him that day.

P. T. M. (PAY THROUGH METER).

By ANDREW WALKER, Engineer and Manager, Gas-Works, Kilbarchan.

Statistics, so far as available, show that there are in Scotland a large number of small undertakings, with a manufacture of 20 million c.ft. and under per annum, but whose aggregate output is well over 1000 millions. It is not often that a voice is heard from these small works, but it is only fairness to this Association that someone should come forward and give an account of his stewardship, and show what we in the backwoods of the industry are doing to keep the flag flying. The record may be of interest and may contain sufficient originality and usefulness to justify itself. From these same statistics it is learned that among these small undertakings the gas sold per consumer ranges from a maximum of 22,000 c.ft. to a minimum of 6000 c.ft., with the average about 12,000, and unaccounted-for gas from as high as 24 p.ct. to as low as 5 p.ct.

In Kilbarchan, when I was placed in control in 1920, the annual make was 10 millions, gas sold per consumer 10,090 c.ft., and the unaccounted-for gas 20·14 p.ct. With a view to reducing the latter, a policy was shaped towards increasing the gas sold per consumer, and special attention was given to the use which might be made of the slot meter. With the feeling that increased sales would result, consumers were offered every encouragement to change over. Circumstances enabled us to make a substantial reduction in the price of gas, and instead of altering the change wheels the rebate was simply handed back. Knowing the value of service and realizing that an important essential in service is an easy payment system, thoughts were directed to what use could be made of this rebate to the mutual advantage of consumer and supplier. On the quarterly round a sharp look-out was kept for all defective appliances, and the offer made to replace these and take payment from rebate of slot meter. That is the story of the adoption—perhaps I might claim the creation—of the system of P.T.M. (Pay Through Meter). In our anxiety to get the scheme into action, we were perhaps free and easy in our conditions. These were:

1. Make your own terms of payment.
2. One month's trial without obligation.

In view of the fact that some consumers had a very elastic idea of terms, the first condition has had to be modified, and we now lead them to understand that payment is expected in four instalments, but longer term payments are arranged according to value of purchases. No formal agreement is asked for, and, as yet, this mutual trust has worked smoothly and without trouble. As it is mostly the housewife with whom the "gasman" has to deal, it will be found that there is a reluctance to sign a form. We still adhere to the second condition, and this assurance in ourselves and confidence in our goods has had a great deal to do with the success of the scheme. At first much of the work was given out to the local plumbers, but so successful was the scheme that ultimately it was decided to employ a full-time fitter; and the better service we were then able to give led to increased business. We do not believe in paying a tradesman to perform other than tradesman's work; and to overcome the possibility of not being able to employ a fitter fully, we conduct a fairly successful plumbing business. This takes up the fitter's spare time and proves a considerable source of revenue.

VALUE OF A SHOWROOM.

Sales per consumer were increasing, and unaccounted-for gas was coming down, and this enabled us again to reduce the price, giving a greater rebate and a further opportunity to push the business. Two years ago a showroom was opened, and the business which it has brought has been a revelation. So much so that I unhesitatingly say that the small works without a well equipped showroom is losing a golden opportunity.

Going round the consumers is an interesting experience and certainly a study in psychology. As an old-established commodity and one giving unfailing service, gas gets very little credit for the part it plays in everyday life. It is taken so much as a matter of course that the thought often suggests itself to shut the supply off for a week-end, to shake the community up and make them realize what it means to them. As this is too drastic, no opportunity is lost to counteract this atmosphere and dispel the "inferiority complex" that has been thrust upon us. The manager who undertakes his own collection can make these opportunities. We instruct our workers, even the stokers, to talk "gas" on every opportunity, and to keep a look-out for all gas appliances, and, if these are not functioning properly, to report them. We impress on our workers that a dissatisfied consumer is a reflection on them as well as on the undertaking. This gives each worker a sense of responsibility and breeds enthusiasm. Enthusiasm is contagious; and while it makes for happy working relations, it also permeates the whole of a small community, and the undertaking receives the respect and confidence of a virile concern.

NO ORDER TOO SMALL.

P.T.M. sales include high-grade cookers, fires, wash-boilers, bowl fittings, carcassing, &c. Ordinary cookers are let out on simple hire; high-grade cookers are sold at cost price *plus* 10 p.ct. and fitted free; gas fires, wash-boilers, &c., at list price and fitted free; and burners, pendants, &c., at usual retail rates. We are prepared to lay our goods on the doorstep, and no order is too small to deliver and fit, and no complaint too trivial for immediate attention. A mantle or a burner nozzle is delivered, fitted, and charged P.T.M. If the grocer is prepared to deliver the smallest order, why not the Gas Company. It begets the gas-work habit, so that for anything concerning lighting, cooking, or heating, consumers' thoughts automatically turn to the source of supply. The result is that the entire gas business in the district is now under the control of the Gas Company. Control from the holder to the burner has been our aim, and to all intents and purposes we have realized that ideal. There is as yet no electric competition, and we pride ourselves that the steps we have taken have helped to retard its advent. It will come some day; but it is better to give the utmost service we can before its appearance than have consumers think we have been forced into it. While all classes of business have been welcomed and sought for, we have concentrated on the lighting load, recognizing it as our front line trenches and the point most liable to attack when our competitors do arrive. The number of bowl fittings installed in a small community like Kilbarchan is surprising.

It must not be understood that this system is confined to automatic consumers. The same quarterly instalment terms are offered to ordinary consumers, and it is interesting to note that where this has been taken advantage of, the account is generally paid in full after the first instalment; but the greater bulk of the business has been transacted with slot consumers. A few comparisons over periods of five years will show the progress that has been made:

—	1920.	1925.	1930.
Number of ordinary consumers .	449	460	420
Gas sold per ordinary consumer, c.ft.	10,480	19,500	20,400
Number of slot consumers . . .	290	348	468
Gas sold per slot consumer, c.ft. .	9,700	12,900	18,200

REMARKABLE RESULTS.

The annual make is now 18 millions, the sales of gas per consumer over 19,000 c.ft., and the unaccounted-for gas 5·31 p.ct. This has been accomplished without adding to capital, and the capital employed per million made has been reduced from £466 to £283, in almost exact inverse ratio to increased sales. The result is reflected in the price, which has been reduced from 7s. 6d. to 3s. 9d. The meter change wheels are still unaltered; and this allows a very handsome rebate to be returned. Such a proceeding may seem ludicrous, but is it? We have adopted the slogan "The more you burn, the more you get back," and we repeat this on every occasion. The idea gradually sinks in, and consumers begin to think of other gas consuming appliances. Not only this, but were it possible for you to accompany me, say, on the December collection and see the pleasure with which the "gasman" is welcomed, hear the children telling of the presents they are to receive "out of the meter," you would realize that the story of Santa Claus is not entirely a fable. This is creating goodwill and the happy relationship that make for prosperity.

In a small works, where the staff is generally confined to one, it is necessary to make the book-keeping for P.T.M. sales as simple as possible, and for this purpose we make use of a duplicate invoice book. Each day, sales are entered through this book, the duplicate is detached, endorsed with the name and address and corresponding survey book number, and filed. At the quarterly survey, accounts are taken relating to the district in which the collection is being made. If the account is paid in full it is written off in the duplicate invoice book and the transaction is closed. At the end of the quarter all unpaid or partly-paid accounts are transferred to the ledger so that they may not be lost sight of. At the time of the transfer a statement is made out showing the balance, and this is endorsed and filed, so that the file at all times is a correct record of the accounts outstanding for Payment Through Meter. This duplicate invoice book acts as a subsidiary ledger which is closed each quarter, and all outstanding accounts and balances are carried to the ledger proper. This system is simple and efficient, and quite acceptable to the auditor.

Life on a small works can be very harassing, where the man in charge has to be manager, collector, fitter, and often the stoker, and we may sometimes be tempted to look with envy on those higher up the ladder; but there are compensations. The "larger" managers miss the personal touch, they cannot count the whole community their friends, they seldom experience the pat on the back from a satisfied consumer; theirs

more often is the doubtful pleasure of reading those effusions to the Press by that Italian author "*Pro Bono Publico.*" It may be that some of us in charge of small works may think that the position we hold is so modest that what we do does not count in the scheme of things; but let us never forget that we are units in a great industry, an industry that has done more than any other in the land to provide leisure for the women folk; and, by such service as we give, so will the whole industry be judged in that district where it is our fortune to be situated. Surely nothing but the best is good enough for such a responsibility.

There must be many small undertakings in the country, struggling along, to whom competition is a very serious matter; and if this short paper has given any one an idea whereby he might, at least, hold what he has, the thought will be recompense indeed.

Competition has become so keen, often unfair, and sometimes unscrupulous that I have become a convert to the Americanized version of an old maxim—"Do unto others as they do unto you, but do it first."

Discussion.

Mr. W. M. Mason (Manager of the British Commercial Gas Association) said he desired to pay a personal compliment to the author for the splendid contribution he had made to the proceedings—the contribution was a model in condensation, and was a complete record of the essential changes that had been accomplished. The author explained how ten years ago he took over the control of a derelict little gas-works at Kilbarchan where the annual output was round about ten millions. There was at the time of his appointment a tremendous loss of gas and only a mere handful of people to work upon. Mr. Walker had succeeded in turning this almost derelict undertaking into a prosperous concern. He showed in the paper how it had been done, and he did so with clearness, conciseness, and humour. It was quite evident that the author was a man who really enjoyed his job and did it so thoroughly that he was a credit to the whole gas industry. It added to the value of the paper to reflect that this splendid record of work had been accomplished in a small gas-works, and it was an example that might be emulated by many in the industry. Mr. Walker, it seemed to him, had presented them with a model of what could well be done in practically every undertaking provided the job was efficiently tackled from the manager's own point of view. The gas industry, like many other industries, had, of course, its national associations, but he (Mr. Mason) feared there was just too much of a tendency to look to these associations and organizations to do things which they were primarily not intended to do. It was really refreshing to find a man like Mr. Walker, who tackled his own problem in an aggressive and spirited manner and brought it in the end to a successful fruition. This was one of the most refreshing papers he had listened to, and it gave him pleasure to bear his testimony to that.

Facing the Problem.

Mr. David Vass (Perth) said he had to congratulate the author in having taken his courage in both hands and in facing up to the problem that confronted him. That was what the managers of the smaller undertakings had got to do when they set out to look for business. Many years ago the question of increasing the sales of gas came before him, and he suggested that improvement might be effected by the introduction of slot meters. The scheme was started and had proved most successful. There were a good many places up and down the country where slot meters would save the situation. Then with reference to development in gas fires and cookers, they had in Perth been most successful, but it was only by payment through the slot meter that they were able to give the facilities they did. People had introduced new and up-to-date appliances in Perth who could not have faced the expenditure had there not been a system of doing so through the meter. The payments were spread over a period of five years, and it was a line of development that he felt could be more generally adopted.

Mr. H. G. Ritchie (Falkirk) said it occurred to him that there might be one point in which Mr. Walker might have trouble in future. According to what he represented in his paper the price through the meter covered the cost of the appliances, but the day might come when the author would be faced with electrical competition. In his own town he had electrical opposition, and the discovery he had made was that many of the gas consumers paid their electricity bills out of the surplus money they had left to them in the slot meters. Mr. Walker, he feared, would have to change his policy if he was faced in the future with a situation of that kind.

Ample Supply Pipes.

Mr. James Bell (Dumbarton) observed that there were many ways in which the consumption of gas could be increased, and Mr. Walker had found one. Personally, he had discovered that one good way of increasing consumption was to ensure in the first instance that consumers had a service pipe of ample size to give them all the gas they required. He had renewed many hundreds of service pipes, and he could safely say they had paid for themselves well. Formerly the pipe might have been insufficient to carry any extra appliances, and it was a good thing to effect renewals. It certainly had a tendency to keep up the average consumption.

Mr. A. S. Nisbet (Paisley) expressed his admiration for the paper, which, he said, came fully up to his expectations. From his acquaintance with the author he knew from the outset that the contribution would not be found lacking either in execution or delivery. In Paisley they had been working along the lines suggested in the paper, but there were always, of course, local considerations which entered into a matter of this kind. There was a great field nowadays for the prepayment meter, because payment by the instalment system had become quite popular in regard to almost everything. The information Mr. Walker had given was most valuable and would be of help to those managers who were seeking to increase their consumption along the same lines.

Mr. J. W. Napier (Alloa) said that as the Secretary in Scotland of the National Gas Council he desired to thank the author for his timely contribution. The circumstances of many of the smaller gas undertakings throughout Great Britain had given the Executive of the National Gas Council very serious concern, but the evidence that had come from Kilbarchan was very welcome indeed. It showed that the situation could be dealt with very satisfactorily. The approximate consumption of gas had been increased from ten to eighteen millions, the price now was 3s. 9d., and the capital per million had been reduced from £400 to £283. That was precisely the kind of evidence the National Gas Council had been asking for, and it furnished an answer as to the question of the future outlook for gas supply by the smaller gas undertakings throughout the country.

Benefit of the Slot Meter.

Mr. J. Houston (Kilbirnie) expressed the opinion that the slot meter was the greatest benefit that had come to the gas industry during the past ten or fifteen years. So far as his own district was concerned, it had proved to be a most decided boon.

The President said he might sum up the paper by saying that it asked everyone present the question—Do you enjoy your job? It was a contribution that plainly indicated that if one enjoyed his job one would be successful in the matter of accomplishment. He could readily understand how Mr. Walker had proved so successful as a gas manager in Kilbarchan—he was capable of making a direct and irresistible appeal to every consumer. It was most delightful to think that a man of the author's personality should go out and about showing the greatest measure of confidence in the product he had to sell. The whole spirit animating Mr. Walker's work in Kilbarchan was one that ought to inspire every manager, no matter whether the undertaking he had control of was large or small. The paper altogether was a striking example of what could be accomplished by diligence and assiduity. The author had done much, but he (the President) was confident that he was capable of doing more.

Mr. Walker's Reply.

Mr. Andrew Walker briefly reviewed one or two of the points that had emerged in the course of the discussion and concluded by remarking that never in his wildest dreams did he imagine his paper would have been so well received. He felt, however, that he had to thank the President for inviting him to contribute to the business of the September meeting.

Thoughts at Random.

Mr. Peter M. Sim (Buckie) then read a paper entitled "Thoughts at Random." This, with a report of the discussion, will be given next week.

Election of Office-Bearers.

It was announced that, as a result of the ballot, the office-bearers for the ensuing year would be:

President.—Mr. H. G. Ritchie, Falkirk.

Vice-Presidents.—Messrs. T. W. Harper, Ayr; and A. S. Nisbet, Paisley.

Councillors.—Messrs. H. A. Aitken, Leven; and S. Dickie, Dumfries.

Mr. Ritchie suitably thanked the members for electing him President. He said he had the permission of his Town Council to hold one of next year's meetings in Falkirk, but he would leave it to the Council to make the necessary selection.

Presentation to Retiring President.

Mr. Napier presented Mr. Fulton with a memento of his year of office. He explained that Mr. Fulton had entered the profession through the Junior Association, in whose deliberations he always played a conspicuous part. His identification with the senior ranks of the industry had been marked with success, and particularly so in regard to the gas undertaking over which he had direct control.

Mr. Fulton briefly acknowledged the presentation to him of a replica in miniature of the bust of William Murdoch at Lugar.

On the call of Mr. J. E. Blundell (Carlisle), a comprehensive vote of thanks was passed to those responsible for the success of the meeting.

There was a clamant call for "The Secretary," and, in acknowledging, Mr. Kellock said he was delighted that everyone appeared to be satisfied. He was gratified that Mr. Fulton had been so conspicuously successful in his year of office as President. Mr. Fulton and himself had been colleagues together in the Junior Association.

Competitions.

Mr. C. F. Dunlop, of Glasgow, had, as has been the custom for some years, charge of the bowling competition which was played on Wednesday over the Carlton Place Bowling Green, kindly lent for the occasion by the Aberdeen Lawn Tennis and Bowling Club. Mr. James Ireland, of Carnoustie, skipped the winning rink, which was 24 shots up. The skip's

supports were: Messrs. James Young, Girvan; A. Stewart, Blairgowrie; and J. Brodie, Coupar-Angus.

Mr. James O. Scott, New Grange Meter Works, Edinburgh, was responsible for the arrangements in connection with the annual golf competition, which was decided over the Balgownie Links, Edinburgh. At the close of play, it was found that the winner of the challenge bowl and accompanying trophy was Mr. Peter Sim, with a gross of 88, handicap 14, and a net score of 74. The scratch prize was won by Mr. Peter Blackhall, Edinburgh, with 85.

Handicap prizes were: Section I. (those with handicaps up to and including 15): 1st handicap, Mr. R. L. Laing, Brechin, 87 (9)—78; 2nd handicap, Mr. A. B. Bradley, London, 92 (14)—78; 3rd handicap, Mr. John Anderson, Edinburgh, 90 (10)—80; 4th handicap, Mr. Alex. Mackenzie, Dunblane, 91 (11)—80; 5th handicap, Mr. A. C. Young, Bridge of Allan, 93 (13)—80. Section II. (those with handicaps above 15): 1st handicap, Mr. C. J. Gregg, Glasgow, 101 (18)—83; 2nd handicap, Mr. A. Brown, Edinburgh—100 (16)—84; 3rd handicap—Mr. R. W. Broadhead, Ashton, 102 (18)—84; 4th handicap, Mr. S. Hall, Edinburgh, 104 (20)—84. Novelty prize, Mr. John Wilson, Motherwell. Despite the inclemency of the weather it is a point worthy of interest that no fewer than 49 members of the Association took part in the competition, and at the close there was nothing but unbounded praise for the popular Balgownie course.

The Annual General Meeting of the Golf Circle was afterwards held in the club-house; Mr. George Keillor, the Captain, in the chair. There the members were gratified to hear that their numbers stood at 80, and that the Circle was the proud possessor of what many a lauded club lacks—a credit balance at the bank. After the reading and adoption of Mr. J. O. Scott's precisely-worded minutes of last meeting, Mr. J. Winson Scott (Manchester) was enthusiastically welcomed as the Captain for 1930-31.

Hitherto a "President" has led the Circle; but now "Captain" is to be the title, and the President for the time being of the N.B. Association is to be Honorary President of the Golf Circle.

Mr. J. O. Scott (Edinburgh) and the Committee were unanimously re-elected.

Mr. David Fulton presented the prizes, and the filling of the Challenge Bowl brought a happy meeting to a close.

The Social Side.

Apart from the meetings of the Golf and Bowling Circles, a programme of social events had been arranged for the visitors. On Thursday afternoon the ladies enjoyed a drive round the Granite City and its environs, and took tea at Hazlehead. In the evening the Conference was honoured by a Civic Reception at the Town and County Hall, where dancing and entertainment continued until midnight. A telegram in the following terms was received from Mr. Harold E. Copp, President of the Institution of Gas Engineers:

> Cordial greetings and all good wishes to the members of the North British Association.—Copp.

On Friday, the meeting was brought to a close by an excursion through the glorious Dee Valley to Braemar, where lunch was served in the Fife Arms Hotel, and on to Linn o' Dee.

Group Photograph.

Mr. A. Kellock writes saying that owing to the hurried way in which the group photograph was taken at the Annual Meeting, it was impossible for the photographer to have a proof to submit to members, and consequently he was unable to book any orders. Copies of the photograph may be had upon application to the photographer, Mr. Fred. W. Hardie, 416, Union Street, Aberdeen, or to Mr. Kellock, Gas-Works, Airdrie.

WILLIAM YOUNG MEMORIAL LECTURE

North British Association of Gas Managers

By Sir Arthur Duckham, G.B.E., K.C.B., M.Inst.C.E., M.Inst.Gas E.

"Assidue Exquirendo Servire"

When your Association honoured me by asking me to give the William Young Memorial Lecture this year, I felt that I could not do better than take as the text of my address the new motto of the Chartered Institution of Gas Engineers—

"By Diligent Investigation We Serve."

Practically the whole of my working life has been devoted to the development of new ideas and the study of fuel problems, and it seemed to me that a recounting of some of my experiences would be of interest to you not only because of their variety, but because the various problems have been considered from the point of view of the contractor rather than that of an engineer in charge of a works.

The new motto of the Institution of Gas Engineers would serve admirably as the keynote of a successful contracting business. The interests of the gas industry have been well served by the contractor, by whose constant investigation and endeavour plants have been improved and new processes developed. The contractor acts in effect as consulting engineer in getting out new schemes; as contractor, when erecting the plant; as instructor, when training the men to operate the plant; as investigator, if unforeseen circumstances arise. If new developments are installed, it is to a major extent at the contractor's risk; if competition cuts profits to a nominal figure, it is the contractor who has to go without; if failures occur, the contractor has to make good. Yet it is the plants—carbonizing, handling, bye-product, purification, and distribution—conceived, designed, tested, investigated, and backed by the gas-works contractors, which are predominant throughout the gas industry to-day. "By diligent investigation we serve."

The Contractor's Problems.

The contractor's problem is to develop plant to meet the needs of his prospective clients, to realize the difficulties with which they are faced, and, by the solution of their troubles, to gain their confidence and goodwill. To be successful, a contractor must gain a reputation for technical ability and high potentiality for service. Further, he must deal efficiently with the most varied conditions of operation. Not one class but every class of coal has to be studied, the conditions of not one locality but of every locality throughout the world have to be appreciated. From this standpoint I will therefore endeavour to set out some of the work with which I have been intimately associated during the past thirty years.

The past thirty years have seen immense changes in the process of gas manufacture. When I first drove a scoop in a hand-charging house at the Old Kent Road Works of the South Metropolitan Gas Company we were satisfied with 11,000 c.ft. of gas per ton of coal. The calorific value of the gas was of no moment, everything depended on the candle-power as measured on what is to-day an obsolete burner. Manual labour was largely employed for charging and discharging retorts. To-day, engineers are dissatisfied with makes of gas below 15,000 c.ft. per ton, and some demand 20,000 c.ft. per ton. The candlepower standard is dead, and we think only in terms of the therm. The process of carbonization has been largely mechanized, and labour costs have been reduced practically to a minimum.

The Selection of Coal.

First, I would touch on coal—a substance about the complexity of which we know far too little. Too often in the past—and often in the present—coal has been purchased on the sole consideration of price, no investigations or calculations being made as to whether in local circumstances the cheapest coal is the most economical in the long run. Take, for example, the behaviour of coal in a retort. Each type of coal has its own peculiarities and requires a special temperature and a special length of time for carbonizing.

This has a very important bearing on the subject of guarantees for carbonizing plant, and it is of interest to follow the variations in such guarantees. These depend on the amount and nature of the volatile contents, the amount of ash and its fusibility, and the physical condition of the coal.

Too often efficiency in operation is not obtained because different types of coal are carbonized indiscriminately, and it is not possible to modify at frequent intervals the carbonizing conditions to suit the different types. This trouble can be eliminated either by buying coals of similar type or—to my mind preferably, as it enlarges the scope for the purchase of coal—by making arrangements to blend or intimately mix varying coals before carbonization. Constant conditions in a carbonizing plant are as important as in any other manufacturing process. For instance, it would be absurd to consider

the running of an internal combustion engine with ever-changing fuels. Such a comparison is not overdrawn.

The utilization of coal of one type or of a constant mixture allows the carbonizing plant to be operated under the best conditions, and does not call on the operator for an undue amount of intelligence or skill. If constancy of coal quality is ensured continuously operating vertical retort plant will give improved results. I am quite certain that on many works results 10 p.ct. to 20 p.ct. better than are now being obtained could be reached if this question of constancy of coal quality to the retorts were given proper attention. That this is recognized is proved by the fact that engineers in control of many of the smaller continuous vertical retort plants of all systems confine themselves to selected coals to their financial advantage.

Size of Coal.

Closely associated with the quality of the coal is the size of the coal. We have investigated the effect of variation of size of coal on the carbonizing results, especially in connection with continuous vertical retorts. With slightly swelling coals, such as those from Scotland or Derbyshire, the best results are obtained by working with quite a large proportion of fines in the coal. This, when the coal has a low caking index, may have a deleterious effect on the coke, but the therms per ton will certainly be higher. On the other hand, in the carbonization of highly swelling Yorkshire, Durham, or similar coals, it is advantageous to work with as small a proportion of fines as possible. Absence of fines in this case leads to easier working, higher throughputs, and better steaming efficiency. The presence of fines involves a closely packed charge, which, in conjunction with the swelling of the coal, causes internal pressure in the retort and consequent loss of gas through cracking and leakage.

The result of this investigation has been that, when working with slightly swelling coals, we specify that the coal breakers should be closely set, and when working with highly swelling coals we specify that any material under (say) 3½-in. cube should by-pass the breakers, and that these should not be set to break the coal smaller than 3½-in. cube. Very marked improvements have been obtained by doing this.

One of the immediate and important benefits arising from the blending of coal is that a constant fuel is available for the producers. Constant temperatures in the carbonizing plant are essential for obtaining good results. Steady working of the producers has a direct effect on temperature, and a producer fuel of constant quality, even with a higher ash content, is far more satisfactory than fuels with an ash content lower in the average but varying widely.

Temperature of Carbonization.

The temperature of carbonization is another vital factor. With reference again to continuously working vertical retorts, one can state that with Scotch coals the best results are obtained by working with high top temperatures. The light tars are given off readily, and unless high temperatures are carried at the top of the retorts, gas makes suffer and tar makes are increased. With more highly swelling coals, it is possible to work with the highest temperatures lower down the retort; in fact, with highly swelling coals there may be certain advantages in increasing the amount of carbonization carried out at these lower levels.

The change-over from candlepower to calorific value standards opened up a vast sphere for development in carbonization practice. Opportunity is now afforded to obtain the most economical thermal results from different coals, and different kinds of carbonizing plant, and, further, by the introduction of steam it is possible to make use of the heat in the coke before it leaves the retort with the formation of water gas. It would take a separate paper to give the facts and figures for steaming retorts, but these may be found in the publications dealing with the valuable work done by the Institution of Gas Engineers and by the Fuel Research Board.

Steaming.

There are, however, two considerations relating to steaming which are worthy of mention—first, the commercial value of steaming, and, secondly, the effect of steaming on the life of the setting. It is by no means a foregone conclusion that large thermal yields obtained by intensive steaming lead to the cheapest gas. High percentages of steaming reduce the coal throughput, and do not markedly increase the output of therms from the plant. Fuel and maintenance costs are greater; capital and labour costs are not appreciably affected. In addition, other factors come into play such as the increased cost of distribution per therm for the lower quality gas. It is necessary to work out a balance-sheet for each individual case; there are so many variable factors that generalization is impossible. From a large number of ascertained results it appears that with a normal Yorkshire coal the best all-round carbonizing results are obtained in continuous vertical retorts where working to a standard of about 475 B.Th.U.

Intermittent vertical chambers, on the other hand, produce under non-steaming conditions a straight gas with a higher calorific value than that from continuous verticals—say, 25 B.Th.U. higher on the same coal. The steaming in a continuous vertical retort is continuous, in an intermittent vertical chamber the steaming is only performed for two or three hours after the carbonization of the charge is complete. Below a calorific value of 500 B.Th.U. there is a rapid loss in the thermal and commercial efficiency of this intermittent type of plant.

The moderate steaming of intermittent vertical chambers does not seem to have any deleterious effect on the brickwork, but when continuous vertical retorts are heavily steamed there is always a danger of the joints in the lower portions of the retort being affected. The action is on the following lines:

In order to get the best effect from steaming, a high temperature must be worked at the bottom of the retort. There is no scurf formation in this zone, and therefore the water gas formed is in direct contact with the retort material and joints. The water gas has a reducing effect, and in consequence the iron in the ash, liberated from the coke by the formation of the water gas, is reduced to a ferrous state; and provided the temperatures are high, then this ferrous iron will attack the joints and the bricks (both of which are usually highly siliceous) and will in time eat right through. It is therefore advisable to ascertain the amount of iron in the ash before intensive steaming is carried out. We have had special examples of this erosion during the periods of coal strikes, when inferior coals have been used and greatly increased steaming has been in operation. There is no doubt that great damage has been caused to retort settings during these times.

I do not propose to deal in this paper with the specific construction of any form of carbonizing plant. These are well known; but I would point out that the whole of the development has been on the lines of obtaining simpler, stronger, and more easily controllable plant. Future developments must be on the same lines; and although much has been done, still the future must always hold great scope for invention, research, and achievement. It will well repay the gas industry to encourage such development work and to see that antiquated technique does not obstruct the path of progress.

Refractories.

The gas industry has during the last twenty years devoted a great deal of attention to the question of refractories. Failure of brickwork may mean heavy loss, inasmuch as a considerable portion of the plant may have to be replaced. I know of too many instances in the past in which the necessity to replace faulty refractories has dissipated all profits and caused actual loss on the job to the contractor.

The chief trouble in earlier years was the shrinkage of the fireclay material under increased heats and increased loads. Although a brick might be burnt to a satisfactory temperature, and might give a satisfactory test, this brick, when submitted to a soaking heat over long periods, would gradually soften and shrink, causing an ever-increasing dislocation in the flues and retort walls of the setting. This trouble was met by the addition of fireclay grog and silica to the fireclay; and a brick satisfactory for temperatures up to (say) 1300° C. was evolved. A further disadvantage of the fireclay brick was that in high-speed—and thus high temperature—carbonizing, there was not much latitude for the carelessness or inattention of the operator; and I have seen instances where a whole setting has been ruined on a night shift owing to a gale having sprung up, with consequently increased chimney draught and undue heats in the setting.

To meet these difficulties the gas industry now uses high-quality silica material, and in so doing has involved both gas engineers and contractors in a long period of research and experiment before success has been attained. In the earlier days expansion of the silica made it almost impossible to build a setting that could be held within bounds and yet which if held too tightly did not give trouble from the disruption of the material under pressure. It was found that high temperatures over long periods during the manufacture of the bricks were necessary to get the proper conversion of silica, and the consequent reduction of the permanent expansion. To-day we have reached a minimum of permanent expansion in silica work, but the reversible expansion has still to be taken care of, and the question of expansion joints is of the utmost importance. Simplicity of setting, construction, and flueing is essential in order to obviate gas leakage.

The spalling of silica in certain low-temperature zones is another matter of critical importance. This spalling is to a certain extent the function of the composition of the various types of bricks, and certain bricks give less spalling than others. Although in the first case it was thought that spalling might necessitate repairs at frequent intervals, it was found that when the thickness of the brick had been reduced to a certain extent, then spalling rapidly became less, and, in fact, disappeared.

To-day we have satisfactory materials available for use throughout a carbonizing plant of any type, and I am glad to say that our British materials are certainly as good as, if not better than, the materials from any other country.

Maintenance Costs.

The cost of maintenance is of vital importance in ascertaining the cost of gas made; and everything must be done

to obtain a longer life from retort settings. I have already mentioned that too high a price can be paid in increased maintenance charges for high outputs, heavy steaming, and high thermal yields. I could quote cases where retorts have worked from eight to ten years with no repairs at all. In other cases retorts have required heavy renewals after two years' work, through no faults in material or workmanship.

In the coke oven industry it is taken as an axiom that no plant should ever be let out, as it is found to be practically impossible to light up an installation after it has been cooled down, and obtain results as satisfactory as before. It is often the practice in the gas industry to shut down a plant during periods of light load, but it would be far better practice during such periods to slow down as far as possible plant that does not require repair. A shut-down of a plant is equivalent to about 200 days off its life. Confirmation of this statement is given by the fact that silica-built coke ovens have already given fifteen years' life in full operation with no repairs other than hot patching. Such a continuous period of high temperature working is unknown in the gas-works.

In the normal operation of a plant it is necessary to be able to repair brickwork while in a heated condition, to stop leaks, and also to make good the surfaces of the retort. In order to render this possible much investigation has been carried out on the development of suitable cements, with very satisfactory results. Undoubtedly close attention to leaks after scurfing would prevent further development of such leaks, and so give a longer life to the plant. I believe it should be possible to make the operation so simple that it might become standard practice to spray the whole of the inside of the retort each time after scurfing.

Producer Developments.

As I stated earlier, one of the most important factors in obtaining satisfactory carbonizing results is the even heating of the retorts by assuring a constant supply of producer gas—constant in quantity and quality. In earlier days we operated with a bar-grate producer with the consequent frequent clinkering and varying conditions of the fuel bed. To-day we have developed an entirely satisfactory step-grate producer that will operate without clinkering, requires the minimum of pricking up, and yields a minimum of carbon in the ashes. The critical features of this producer are the angle of the grate, the depth of the fuel between the bars of the grate, the skirt of the coke heap below the curtain arch at the back of the producer, and the prevention of the formation of clinker immediately inside the top of the producer door. By the careful proportioning of the fuel bed, there is no inclination for excessive combustion about the top of the step-grate; combustion is thrown rather towards the bottom. Formation of clinker is thus prevented and the amount of carbon in the ashes reduced.

By arranging for a large storage of coke in the producer, the fuel is gradually raised in temperature as it descends to the gasifying zone, and, by the proper charging of the coke to the producer, any fines in the coke are segregated on the front and side walls, thus preventing an easy passage of air and the formation of clinker about these critical zones. Further, we prefer to work the producers under a definite pressure—that is, to introduce air by means of a steam jet. This arrangement gives to the retort house supervisor an easy means of controlling heats. Should there be any change in the coal to be carbonized or coke to be gasified, an alteration to the steam pressure gives an immediate effect, and the temperatures are retained at the desired degree. This method of regulation eliminates the arduous regulation of dampers.

On large installations, it is certainly advantageous for the producers to discharge their gases into a common flue before distribution to the settings. By this means a regular quantity of producer gas is obtained throughout the day, and any dust in the gas tends to deposit in the collecting and distributing main. The size of the step-grates should be sufficiently large so that they will under steam and air pressure handle the whole of the breeze made on the installation, thus making use of the lowest grade of fuel available on the gas-works and eliminating the coke breeze problem.

Outside producers have also been investigated; but for general practice, and so long as the flueing of the settings is simple, I cannot see any advantage in capital cost, operating costs, maintenance, or quality of the gas of this type of producer over the specially developed brick-built step-grate producer mentioned above.

Although the first steps in design, construction, and operation of the carbonizing-plant lie with the contractor, this work could not have advanced as it has without the hearty co-operation of all those engineers running the plants. It is the experiences and suggestions of our clients which drive us to think ahead and plan accordingly; it is the criticisms of our clients which keep us from resting on our oars.

Coke.

In order to arrive at a low price of gas delivered to the gasholders, which is the chief desideratum of the gas engineer, it is essential that as high a price as possible should be obtained for the products derived from coal other than gas. Price is regulated by demand, and demand can be augmented by the preparation of the most suitable article and the best salesmanship. In early days in all gas-works, especially in Scotland, coke was looked on as a practically worthless bye-product, and at some places it still carries the ignominious name of "cinders." I have always felt that insufficient attention was given to make coke attractive as a fuel for the industrial and domestic consumer. Far greater interest has been shown by producers in recent years to encourage the sale of coke, and, as you may remember, we endeavoured to foster this movement by the series of prizes for the best essays on Coke Preparation, Coke Sales, &c., offered through the "Gas Journal" five years ago.

In purchasing coal, consideration must be given to the quality of coke that it will make. In my house I use nothing else but coke for heating, and find great variety in the reports I receive from the people responsible for firing the two furnaces. A low ash content and a low water content are necessary to obtain good combustion, but a coke with a high ash fusion point is of equal importance for central heating as a low percentage of ash in the coke. It is of interest to make tests on coke as supplied from the gas-works to the consumers. Variations are found in water and ash. In some cases the moisture amounts to 15 p.ct. and the ash to a similar figure, and in other cases, where care has been taken in the preparation of the coke, but 2 to 3 p.ct. of moisture and 7 to 9 p.ct. of ash are present.

If coke is to be recognized as the standard smokeless fuel, a greater majority of producers must give similar care to the quality of the coke as to the quality of the gas they sell. I know of many instances where a good market has been built up in a locality, and this good market has been spoiled by the importation of an inferior coke at a lower price.

Considerable advance has been made in the handling of coke. It is one of the most difficult substances to handle, but we have not yet attained ideal screening, coupled with low maintenance costs, and, what is possibly more important, a really satisfactory coke cutter. A regular sized clean and dry small coke meets the needs of the householder. I think it would be in the interests of the industry if substantial prizes were offered in order to encourage the development of really satisfactory coke cutters.

Gas Treatment.

I do not propose to deal with the standard gas plant—condensers, purifiers, and so on—but in three directions connected with gas treatment I have been associated with interesting development work. First, the elimination of all pitch troubles in the retort house by the circulation of large quantities of hot liquor in foul mains, &c.; secondly, the partial elimination of phenols in waste liquors and the proper condensation of the gas; and, thirdly, the development of a liquid purification process. This latter process has made great strides in America, but after the closest investigation we find that its many advantages are counterbalanced in this country by the fact that no process available at present will give the absolute elimination of sulphuretted hydrogen to meet the British standards. It is these last traces of impurity that are so difficult to eliminate; and if oxide boxes have to be provided for this last stage, their capital cost, &c., make the new process of but little advantage to the user.

Ammonia.

I think that every gas engineer would be rather relieved to-day if he made no ammonia from his carbonizing plant. The development of the synthetic ammonia process in various countries has fundamentally altered the whole economic position of sulphate of ammonia production. The formation of the Ammonia Research Committee of the Institution of Gas Engineers came at an opportune time, and it is to be hoped that their deliberations will give the industry a lead on this important matter. It seems to me that a great deal more could be done in furthering the wider use of sulphate of ammonia. During my recent trip to Australia I was impressed with the farmers there who use far greater quantities of fertilizers per acre than the farmers in this country. In the wheat lands of Western Australia, some 100 lbs. of phosphate are used annually per acre, and this with the price of wheat at 3s. 6d. per bushel and a yield of (say) 26 bushels to the acre. All of us who use sulphate quickly realize the enormous benefits that can be obtained; and I believe that an intensified publicity and selling campaign would rapidly pay for itself.

The other bye-products are tar and benzole, and most of the romance of the gas industry has been built up on the former. The wonderful dye industry, many medicines, and other substances of daily use have their origin in coal tar, but unfortunately the quantities required for these special purposes are not sufficient to affect the basic price. During the war the gas industry supplied the basis of many explosives, but this product—tar—stands to-day at an absurdly low figure, and is of but little assistance on the profit side of the balance-sheet of a gas undertaking.

Over the last five or six years we have experimented with a continuous process for the distillation of tar. It seemed

reasonable that a continuous process should be efficient and suitable. By distilling tar over a mass of molten lead the temperature regulation becomes easy and deposits of tar in the apparatus are eliminated. Our work has shown that this process is simple and satisfactory.

Tar for Roads.

The most immediate use and the biggest demand for coal tar is for road spraying or surfacing. For this purpose the gas-works product is in strong competition with bitumen, the sale of which is supported by the strongest financial interests in the world. Undoubtedly, in the earlier stages lack of co-operation between coal tar producers and the active campaign on behalf of bitumen resulted in this imported substance gaining far too great a hold in the country.

Another difficulty has been the agreement and settlement of a proper road tar specification. This specification has to be settled on various factors which cannot be shown to have any real relationship to the suitability of the material for road purposes. This whole question should be reviewed, and the closest investigation work done really to ascertain what processes give the most suitable results with varying tars. This question has received a great deal of attention in Australia, and the Institution has benefited by interesting papers on the subject.

I do not believe that we are doing as much research work on tar as is necessary. We hear of all sorts of new products being obtained from tar—wonderful preservative coatings, paints, and other substances. There is probably a future in the cracking of tar, but each and all these subjects should be studied by a fully equipped organization under a devoted chief. The benefits to be gained are so considerable that they easily justify an adequate expenditure for research. There should be no need to import into this country any foreign material for the surfacing of roads.

If we could raise the price of tar by £1 per ton the annual revenue of the gas industry would be increased by nearly one million pounds. One of the most powerful aids to the sale of gas is that wonderful publication of the British Commercial Gas Association, "A Thousand-and-One Uses for Gas." I would like to see a similar publication for our own education, "A Thousand-and-One Uses for Tar."

It is not possible in the time available to deal with the many other interesting points connected with gas manufacture. I have been more than fortunate to have been closely associated throughout my life with such an important industry, one which, though long-established, still offers full scope for future development and an ever-increasing national service. Times are changing, and we are all finding it essential to work together, both by free interchange of knowledge and by the subjugation of the individual for the benefit of the many.

William Young must always stand as an example to gas engineers, more especially to those who are setting out on the road of life; he sought and he served, and thereby he attained great merit. We have followed in his steps along the same road, and have found that rough places have been made smoother, and direction more definite, by his previous passing. We would pay due homage to this great engineer, chemist, and inventor, in whose memory we meet to-day.

Investigations on Tar Distillate Washes

A paper of some interest to those concerned with the treatment of residual products from gas-works was read before Section M (Agriculture) of the British Association, at Bristol, on Thursday, Sept. 4. It was presented by Mr. F. Tutin (Biochemist at the Long Ashton Agricultural Research Station).

A number of years ago, he said, it was the practice among some growers to use quite a dilute tar distillate preparation in the form of a carbolineum emulsion for checking the development of algæ and mosses on the trunks of trees. The preparation used was in the dilute form, it being the impression among the users that a more concentrated preparation would damage or kill the trees. Eventually, however, someone in Holland, he believed, had used a more concentrated preparation and had noted that the trees had not been killed but had grown with greater vigour in the following year, had produced healthier and larger foliage, and were freed from the permanent Apple Aphis. This discovery had resulted in the preparation, in Holland, of a product originally sold as "Vruchtbaum Carbolineum," which gradually came into use there as a winter wash, with decidedly beneficial results, for by its use the growers were able to control Apple Aphis, Plum Aphis, and the Apple Sucker as well.

A member of the staff of the Long Ashton Research Station went to Holland in 1921 and obtained a sample of the material. There it was analyzed and field trials were instituted, and it proved of very considerable value. Before long a number of quite useful products of British manufacture were placed on the market. Since then the utilization of tar distillate winter washes for the control of insect pests had become to the vast majority of fruit growers a matter of routine operation.

Following the introduction of these washes into this country, the staff at the Long Ashton Research Station endeavoured to investigate their properties, it being felt that they might be able to prepare a superior preparation if they knew which constituents of the tar distillate, for instance, were the most efficient for killing the insect eggs, for, after all, the earlier preparations on the market were more or less of an empirical nature. Analysis of the original preparation showed that it consisted largely of an entire tar distillate obtained from a horizontal retort tar, boiling at from about 190° to 360° C.; to this had been added a certain proportion of a concentrated aqueous solution of resin soap, and by that means there was prepared a liquid which, on dilution with water, gave an emulsion which was fairly suitable for spreading on trees.

A total tar distillate such as that, said Mr. Tutin, naturally contained a considerable variety of compounds. In the first place the distillate was separated into three main fractions—the tar bases, the tar acids, cresols, &c., and the neutral material. It was possible to kill insect eggs with tar acids or cresols alone, but they would kill the plant first. The neutral constituents—boiling over the wide range of temperature from 190° to 360° C.—were first separated into a number of fractions, and the effect of these various fractions were examined. The examination led to the conclusion that the product which gave the best kill of insect eggs was the higher boiling portion of the neutral material. If the spray could be applied to the insect eggs on the trees shortly before those eggs hatched, one could get just as good a kill with the lower boiling portion as with the higher boiling portion, but it was always necessary to apply the winter washes during the dormant season, and the washes had to be put on to the trees some considerable time before the eggs hatched.

One of the difficulties experienced by the researchers was that they could not emulsify this neutral material from the tar distillate by any of the usual methods then in use. Therefore, they had searched for another agent and had hit upon a specially prepared sulphonated oil, which appeared to give them exactly what they wanted. With its aid they made suitable emulsions of the high-boiling neutral material of the tar distillate and carried out very extensive field trials over a period of two years. With this material they could get complete control of Aphis and Apple Sucker in dilutions as great as 3 p.ct., of caterpillar in 6 p.ct. concentrations, and a very good measure of control of Capsid Bug (which had previously been extremely difficult to control) by using a concentration of 10 p.ct.

The action of certain other oils, such as petroleum products, was also investigated, and it was found that in the case of winter moth eggs a 100 p.ct. kill could be obtained with only 2½ p.ct. concentration of heavy medicinal paraffin, whereas the ordinary paraffin oil effected no kill. Mr. Tutin considered that this difference was due solely to the difference in the volatility of the two products; the ordinary paraffin oil evaporated, whereas the heavy medicinal paraffin remained. The tests established quite definitely that the heavy paraffin would control Capsid Bug, red spider, and caterpillar, but one could not control Aphis or Apple Sucker with it, either in laboratory or field trials. The fact that a substance such as this highly purified medicinal paraffin, which appeared to be entirely free from toxic properties, would have this effect led him to conclude that eggs of the nature of Capsid Bug, red spider, and caterpillar were killed by a stifling action, the egg being covered with a uniform oily film, impervious to atmospheric moisture, and which also reduced the oxygen supply. Apparently such eggs as those of the Aphis and Apple Sucker could not be stifled, but they were killed by the definite toxic action of some of the coal tar constituents.

This conclusion had led the researchers to think that probably they might achieve a still further improved winter wash by combining the high-boiling neutral material from a tar distillate with a heavy paraffin, since the tar distillate, in considerable dilutions, would kill Aphis and Apple Sucker. Therefore, trials were conducted with a 50/50 mixture of the high-boiling portion of the neutral material of the tar distillate and a heavy paraffin of low iodine value. The heavy paraffin boiled, for the most part, at temperatures considerably above 360° C., being much less volatile than even the higher-boiling part of the tar oil. Trials with this wash, carried out on black currants last winter, had resulted in practically complete control of Capsid Bug, whereas with any wash employed previously they had not been able to get below about 20 p.ct. of the leaves damaged by Capsid Bug. The new wash had also been used on apple trees, and, so far as they could judge from one season's trial, it seemed to have effected control of Aphis, Apple Sucker, caterpillars, the two species of Capsid Bug, and red spider.

ASSOCIATION OF PUBLIC LIGHTING ENGINEERS

ANNUAL MEETING AT LEICESTER

Mr. Thomas Wilkie, the President of the Association of Public Lighting Engineers, has reason to congratulate himself, and the Association also is to be congratulated, upon the success which has attended the Seventh Annual Meeting and Conference of the Association, held at Leicester last week. The programme was well constructed; the papers presented and discussed should prove to be of great value both to the technical lighting engineer and the layman, and the hospitality extended by the Lord Mayor and Corporation of Leicester was another feature which should make the meeting a memorable one. The success of the meeting was contributed to also by the help which Mr. Wilkie received from his brother officials in Leicester, including his own staff.

It was perhaps fitting that Leicester should have been the venue this year, because the Lord Mayor of Leicester (Councillor W. E. Hincks, O.B.E., J.P.) is a Past-Chairman of the Lighting Committee of that city, and was one of those who attended the meeting, held seven years ago, which resulted in the formation of the Association. Thus, in their host the members of the Association had a friend of long standing.

On the evening of Monday, Sept. 8, the members and delegates were received by the Lord Mayor and Lady Mayoress in the Lord Mayor's rooms at the Museum Buildings, the hosts being accompanied by Mr. S. B. Langlands (who was the Association's first President, and has just completed a second year of office), and Mr. Wilkie (the new President). The evening's programme included a smoking concert, the remainder of the time being devoted to social intercourse and refreshments.

In a brief expression of welcome to the members and delegates, the Lord Mayor drew attention to the fact that it was almost exactly seven years since Mr. Wilkie had left Glasgow and had taken up his duties as Public Lighting Superintendent at Leicester, and that it was also seven years since the Association was formed. Thus the occasion was in the nature of a celebration of two anniversaries.

The thanks of the members and delegates to the Lord Mayor and Lady Mayoress for their kindness and hospitality were ably expressed by Mr. S. B. Langlands.

An Official Welcome.

By the courtesy of the Corporation the meetings were held in the large hall at the Central Fire Station, Lancaster Road, Leicester, and it was there, on Tuesday morning, Sept. 9, that the Lord Mayor extended an official welcome on behalf of himself and the City. With him was Alderman J. Hill, J.P. (the Chairman of the Lighting Committee).

In the course of his remarks, the Lord Mayor said he recalled feelingly the backward position to which, in the past, street lighting had in the main been relegated. He had been Chairman of the Lighting Committee, and had been amazed to find how little interest street lighting had provoked; but when he had got behind the scenes and had seen how antiquated everything was he had not been surprised. In Leicester it had been really pathetic. When a new lamp was required in any part of the city, somebody would say that the city could not afford to provide it unless another lamp was dispensed with in another part of the city. That was due to the Finance Committee's estimate of the value of the Lighting Department, and those responsible for the lighting were exhorted by the Finance Committee not to do anything more than was absolutely necessary. However, in other towns the position had been very much the same. Subsequently, a change had been brought about; there had spread gradually throughout the country a tendency to estimate more highly the value of street lighting departments, and a feeling among local administrators that street lighting had become a matter of real significance. The improvement from that time to the present had been almost phenomenal. He remembered that, as the result of four accidents having occurred in one part of Leicester, the Surveyor's Department and the Lighting Department had been taken into conference with a view to preventing further accidents; there was evolved a scheme whereby traffic islands were provided and properly illuminated, and from that time there had never been a suggestion of an accident at that particular place. Then the police had begun to realize the value of proper lighting as a means of diminishing crime, and gradually street lighting had won a higher civic status, and he felt that in a very few years hence it would have attained something like the position it ought to attain. Much depended, however, upon the lighting engineers themselves. He was satisfied that, while the committees received all the kudos for so-called improvements, those improvements were prompted by the officials. Most of them looked forward to the time when street lighting would not be limited to the bare necessities of safety. He exhorted lighting engineers to go ahead, for they were rendering first-rate public service in every sense of the term.

Alderman J. Hill, J.P. (Chairman of the Lighting Committee), who endorsed the words of welcome uttered by the Lord Mayor, added that the Lord Mayor had omitted to say that it was he who had been the strong man who had set the Lighting Committee in its right position and had never rested until he had laid the foundations of a lighting system which it was believed would eventually make Leicester one of the best lighted cities in the country.

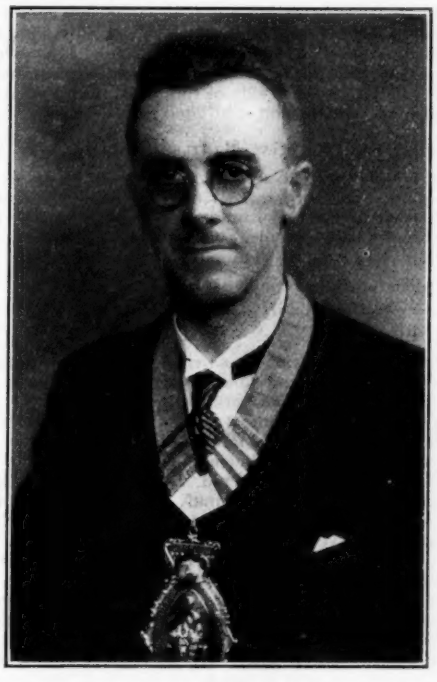
Mr. Langlands expressed the Association's appreciation of the warm welcome extended to the members and delegates.

It was announced that nine new members had joined the Association.

Thereafter Mr. Langlands was presented with the Presidential Diploma recording his services to the Association during the past year—his second year in that capacity.

A Badge Presented to the Association.

A new badge, to be worn by the President, has been provided and presented to the Association by ex-Alderman Joseph Taylor



THE PRESIDENT,

Mr. Thomas Wilkie, Leicester.

(an ex-Chairman of the Lighting Committee of Bolton, and an honorary member of the Association), and at this juncture the donor formally presented it, and congratulated Mr. Wilkie upon being the first to wear it. The Association, said ex-Alderman Taylor, was not formed too soon; since its inception it had done splendid work, and when travelling about the country he had noted the effects of it.

(The badge takes the form of a gold and enamel medallion suspended on a blue riband. The medallion is oval in shape, there being embossed on the centre piece a representation of one of the old beacon lamps. The riband is decorated with seven bars, each of which bears the name of one of the towns in which the Association's annual conferences have been held, and the number of bars will be added to each year.)

The thanks of the Association for this gift were voiced to ex-Alderman Taylor by the President, who also expressed the

hope that the donor would long be spared to continue his association with his fellow members.

PRESIDENTIAL ADDRESS.

The Presidential Address of Mr. Wilkie was published on pp. 578-9 of last week's "JOURNAL."

PRACTICAL USE OF A TEST ROOM.

By W. L. MARSHALL and R. H. REDMILL.

[EXTRACT.]

We look forward to the time when each and every lighting department will be equipped with a test room, and when the results arrived at will form the subject of useful discussion among our fellow members.

In every public lighting department it is imperative that there should be some sort of test room. The equipment need not be elaborate, and will vary with the size of area controlled, the generosity of the lighting committee, and the time which can be reasonably spent therein. The work carried on in the test room of a lighting department, as distinct from research laboratories, will generally be, as we have already indicated, confined to problems directly affecting practical work; and these can be divided into two broad sections—theory and practice. Theory usually, but not always, precedes practice, and our tests are often limited to checking theory, corroborating makers' figures, and maintaining service results. In performing these duties alone a test room justifies itself. It frequently happens, too, that these practical tests disclose defects in the construction of plant, and makers are generally pleased to receive constructive criticism of their products.

The efficient maintenance of an installation after erection is of great importance, and the period which should be allowed to elapse before the fitting is cleaned should be ascertained from actual test of the installation. Owing to the varying climatic conditions met with in practice, it is impossible to arrive at a definite figure for this period. The B.E.S.A. Specification states that the test-point illumination should not be allowed to fall below 50 p.ct. of the original value; and this would appear to be a reasonable figure. The results of our own tests on the question of efficiency drop, as far as cleaning is concerned, show that dust collects on the inside of the glass, and a good case is, therefore, made out for non-ventilated fittings.

GAS MANTLES.

Although apparently no recognized specification exists regarding the quality of gas mantles, it is nevertheless necessary to carry out periodic tests on samples, in order to ensure that the mantles supplied under contract are up to the standard specified in the original quotation. These tests comprise:

(1) Test of initial candlepower.
(2) Test of durability.
(3) Life test.

The first test is, of course, carried out with the integrating sphere, careful note being taken of the pressure and calorific value of the gas at the time of the test.

For the second test, the most generally accepted practice is to use some form of shocking machine, with which the mantle, after the collodion has been burned off, is subjected to a number of "shocks" until it is shattered, the number of shocks being registered by an automatic counter. This is possibly the best method of testing mantles as it approximates most closely to the actual destructive forces upon mantles on the street. Owing to the high durability of modern mantles, however, many thousands of shocks are required before the mantle is broken, and consequently, if the machine is hand driven, an enormous amount of time and energy is expended on each sample. The machine may, of course, be driven by a motor, but even then the process is extremely slow. We have found that a measurement of tensile strength is much quicker and, for comparison purposes, quite satisfactory. In the type of machine employed in our test room, the mantle, after the collodion has been burned off, is lowered over molten wax until the tip is just immersed. The wax is left to set (3 minutes being allowed exactly) and then a regularly increasing force is applied to the bottom of the mantle until it is broken. The breaking strain is provided by a suitably weighted float in a cylinder of water, the pan containing the wax (which is attached to the bottom of the mantle) being fixed to this float. The time taken for a complete test, from the lowering of one mantle into the wax until lowering in the next, is from 5 to 6 minutes.

As distinct from life tests of electric lamps, it is futile to arrive at this in the case of gas mantles. We are afraid the laboratory life would not bear much comparison with the life *in situ*. For this test, therefore, a careful record of the mantle consumption of each lamp is kept by the various depôt foremen. The life figures are then abstracted from these mantle returns, and any abnormalities carefully investigated and corrected. In practice, we are satisfied if our return of mantles used averages about 3 mantles per nozzle per annum.

The price is also a factor, but one which really concerns lighting committees. We therefore, in Leicester, endeavour to take into account all three factors—*i.e.*, durability, candlepower, and price—and combine them in a system of percentages. First of all, durability tests, as before described, are made, and the samples with the greatest tensile strength, measured in grammes, are taken as representing 100 p.ct. The other mantles are then given their appropriate percentages. The same procedure is followed with respect to candlepower—*i.e.*, the mantle emitting the greatest number of candles per cubic foot of gas is called 100 p.ct. With regard to price, the order is reversed—*i.e.*, the cheapest mantle is represented as 100 p.ct. This system is used each year in placing our annual contracts for mantles, and the actual results obtained last year might be of interest.

Samples.	Price.		Strength.		Candlepower.		Average.
	s. d.	P.Ct.	Grammes.	P.Ct.	Actual.	P.Ct.	P.Ct.
No. 1 .	35 7	96·1	243	100·0	24	96	97·36
No. 2 .	36 6½	93·4	236	97·4	25	100	96·93
No. 3 .	34 7	99·1	196	80·8	25	100	93·30
No. 4 .	34 3	100·0	219	90·0	22	88	92·66
No. 5 .	36 7	93·4	209	85·0	22	88	88·80
No. 6 .	36 7	93·4	219	90·0	20	80	87·80
No. 7 .	36 7	93·4	183	75·4	20	80	82·96

Included in the general routine work of our test room are a number of service inspections, which, while they do not, strictly speaking, come within its purview, do most emphatically make for increased district efficiency. The one which we regard as very important is systematic inspection after lighting time. These inspections are made by car, and are quite independent of the routine inspections made by the recognized inspectors. This may appear superfluous, but actually they are invaluable. Two nights per week are spent hereon, one essentially dealing with gas lighting, and the other with electrics. Last year 982·1 miles were covered in this way, and the average percentage of failures, from whatever cause, was found to be 1·27 p.ct.

A check is kept on the time setting of time-switches and controllers. This leads not only to the detection of attendants who are careless, but also of movements which are not keeping good time. Incidentally, we have a qualified clock repairer on the staff, whose sole duty is to look after time-switches and controllers.

Discussion.

Mr. C. H. WOODWARD (Bournemouth), who regarded the paper as indicating that lighting engineers must get more technical, referred to the problem of focussing. In Bournemouth, he said, nearly all the public lighting was effected by gas, and with gas lighting one could not focus. With regard to glare and brightness, he believed it was generally conceded that gas lighting was rather softer than electric lighting. In considering the lighting of one particular road in Bournemouth a scheme for the suspension of the lamps centrally over the roadway was mooted, but eventually the lamps were erected along the side of the roadway, one of the reasons for that decision being that with central suspension there was glare because the illumination on the road surface was at a low angle from the eye. With the side lighting it could be said that the glare was halved.

Mr. J. F. COLQUHOUN (Sheffield), who welcomed the paper as showing that a test room attached to every lighting department was a necessity, disagreed with the statement that the British Standard Specification divided roads into eight classes according to their relative importance, and the suggestion that a minimum illumination was given for each class. That, he said, was a misconception. The Specification did not do that; it had been criticized for not doing it, and it was hardly right that it should be criticized for not doing it and criticized also for doing it. The classification endeavoured to classify installations according to their size, in the same way as one would classify an electric lamp according to its current consumption, an electric motor according to its horse-power, or a gas mantle according to size; and it did not follow necessarily that, because the power of one motor was less than that of another, it was not as good a motor. The Specification stated expressly that these classes were used only for reference purposes and did not necessarily represent the relative merits of the installations. Discussing the reference made in the paper to "average" and "minimum" illumination, he said that his difficulty in weighing up the opinions of people who wanted to displace minimum illumination by average illumination was that they seemed to attach different meanings to the word "average." It was necessary to be definite as to whether, by "average" illumination, they meant the mean of the minimum and maximum illumination, or the mean of a series of tests taken along the centre of a roadway or along the kerb. Assuming an average tramway route, with standards 120 ft. apart, there was an area of 6000 sq. ft. between the two lamps, and one must make up one's mind, before adopting averages, how many of these square feet were to be measured for illumination, and which were to be chosen. Again, one had to consider the light that was thrown on to adjoining buildings, and the effect of that upon visibility; one had to consider whether the readings were to be taken on the horizontal or the vertical plane, and what was the relationship between the readings taken on the vertical plane—on the walls of the building—and those taken on the horizontal plane on the roadway. Discussing mounting heights, he said the authors appeared to think it was a mistake to place lamps high, but he drew their attention to some tests made in Liverpool recently with lamps mounted at a height of 40 ft., the results of which were excellent. Emphasizing the authors' point that testing was imperative in a public lighting department, he

urged lighting committees to try to picture the condition of the roads and the lighting that would be necessary ten years hence, and to ask themselves, not whether they could afford to have a testing room, but whether they could afford to omit it. Present-day methods and standards of lighting would be obsolete in a comparatively short time, and an enormous amount of painstaking research was necessary before they could reach anything like scientific street lighting.

The Photo-Electric Photometer.

Mr. G. H. Wilson (General Electric Co.), discussing the photo-electric photometer, said that, while considerable care was necessary in building it, once it was built it worked very satisfactorily; he knew of such photometers which were working very satisfactorily, and with an accuracy far greater than that obtained with visual photometers. While associating himself with the authors' opinion that uniform brightness on a street surface was desirable in many cases, he suggested that where there was little total light from the light source it was preferable to allow the direct light from the lamps to reach the surface and also to collect and concentrate upon the road surface by means of reflectors the light which otherwise would be directed upwards.

Mr. J. H. Clegg (Burnley), having in mind that a test room of the kind outlined in the paper would be considered somewhat expensive by the majority of lighting departments, suggested that it might be preferable to establish a central laboratory, conducted by an independent person, for the service of all. After agreeing that central and diffracted lighting in roadways generally had a dazzling effect on motorists, he referred to gas mantle maintenance, and said that an average of about three mantles per burner per annum was fair, taking a whole lighting system, but in cases where lamps were suspended at a height of 15 or 18 ft. above the ground (where they were not damaged by children) he had known mantles to last for 3000 or 4000 hours. Mr. Clegg confessed to being somewhat perturbed to note, from the Presidential Address, that electric lighting was considered to be advantageous along the tram routes in Leicester from the points of view of efficiency and economy. Reading between the lines, he imagined that the price charged for gas for street lighting in Leicester was too high, but he saw no reason for the President's decision that gas should not participate in the lighting of those routes for seven years ahead, because the Gas Department might re-consider its position before that period elapsed. As to mechanical control appliances, he held that those used for the control of gas lamps were as efficient as those controlling electric lamps. An analysis of failures had shown that those due to automatic control did not exceed ½ p.ct., and the average number of failures from all causes did not exceed 1½ p.ct.

Mr. E. C. Lennox (Newcastle Electric Supply Company) urged that there should be some means of testing the efficiency of a gas mantle during its life.

Spectrum Question.

Mr. Haydn T. Harrison said the paper would be remembered as one of the first to suggest that the spectrum question entered into the matter of street lighting—in other words, that there were advantages in using the daylight lamp, which cut off 30 p.ct. of the long wavelengths, at the yellow end of the spectrum. With gas one had more control over the spectrum; electric lamps were yellow as compared with north daylight. He could not see, however, why they should cut away the yellow rays, or any rays at all, from artificial light; the yellow rays gave an impression of sunlight. With regard to the collection of dirt on lanterns, he said there was always dirt in the air, which would collect on the lanterns; therefore, one should use lanterns with as small a surface as possible, and he saw no reason for using big lanterns if one could do without them.

Mr. W. J. Jeffery (Charing Cross Electric Light Company), referring to the measurement of illumination, said it was unfortunate that the question of ground level illumination should ever have been introduced into the B.E.S.A. Specification. Prior to the issue of that Specification the illumination was measured on a horizontal plane 3 ft. above ground level, and he preferred to measure it there rather than at ground level.

Ex-Bailie McDougall (Glasgow), emphasizing the value of a testing department, remarked that the testing department in Glasgow had been visited by many ratepayers, to whom had been demonstrated the value of proper lighting in streets, houses, shops, &c., and they had gone away charmed. In that respect it was of considerable value in raising the standard of lighting generally, so that he differed from the suggestion that there should be only one central testing department rather than separate testing departments in the various localities.

The President, replying to Mr. Clegg, did not agree that he was looking too far ahead when he had estimated for the next seven years in regard to the lighting of the tramway routes in Leicester. Gas engineers, he said, had not realized that they were right up against it, and the only way to make them realize it was by competition. The Gas Committee had not reduced charges, but had actually increased them in face of that competition.

The Author's Reply.

Mr. Redmill, replying to the discussion, said he did not suppose there were yet available methods of focussing gas lighting correctly, but that was no reason why there should not be. He believed that gas fittings could be focussed just as were electrical fittings. Directional glass could be used. Replying to Mr. Colquhoun, he said the case put forward in the paper was not for average against minimum illumination, but average combined with minimum illumination.

As to the suggestion that there should be a central testing department, he suggested it might be considered too much trouble to send a fitting to a central department every time one wanted a test carried out, and he was afraid there would be a tendency not to send it at all. That would not tend towards efficiency; every little matter should be referred to the test room if efficiency was to be assured. He agreed that the problem of testing the efficiency of gas mantles would have to be considered. Dealing with the references made in the discussion to the question of uniformity, he said the authors had not referred to uniform lighting but uniform "brightness." The brightness depended on the reflection curve of the road, and by compensating for the curvature of the reflection characteristic of the road surface one obtained uniform brightness, which was more to be aimed at than uniform illumination.

Luncheon.

At the invitation of the Lord Mayor of Leicester, the members and delegates adjourned to the Grand Hotel for luncheon.

The toast of "The Association of Public Lighting Engineers" was proposed by the Lord Mayor, who, referring to the part he had taken in the discussions which had led to the formation of the Association, and the reasons why he welcomed such a body which could bring about co-operation among the various authorities throughout the country, said that when each authority was isolated and was working independently one did not know where to apply for information which would help one to improve the lighting of one's own city. By working together the profession had strengthened enormously its position in the matter of propaganda, and he hoped it would make the most of that, because the public wanted enlightenment.

The latter part of the Lord Mayor's speech was a tribute to Mr. Wilkie, and he mentioned particularly that, by paying personal attention to callers or letter writers who complained of or praised the street lighting Mr. Wilkie had enlisted their support and had been aided by their experience of the particular needs in the thoroughfares about which they were concerned. In that way he had transformed the attitude of the public towards the department, and had extended its usefulness.

The President briefly responded, and thanked the Lord Mayor for his hospitality.

THE CASE FOR GAS IN RELATION TO PUBLIC STREET ILLUMINATION.

By Messrs. Winstone and Bishop.

This contribution will be found in last week's "Journal," pp. 585-7.

Mr. Winstone, commenting on a reference which had been made during the morning to the efficiency of gas mantles, said that a good mantle should not lose more than 10 p.ct. of its luminosity in 1000 hours.

Lantern slides illustrating typical polar curves for different types of gas fittings were exhibited, as well as a number of comparable photographs of streets by daylight and as illuminated by night. A feature of the latter was the excellent distribution of light obtained by the proper disposition of gas lamps.

Discussion.

Mr. W. M. Mason (B.C.G.A.) emphasized (particularly to municipal representatives) the value of the paper and illustrations as showing what modern gas lighting could in fact do. He also commented upon the astounding attitude which was adopted towards the use of gas for street lighting in some quarters, an attitude which was inexplicable to business men. The President of the Association, in his address, had ventured to lecture the gas industry, and had said that those in the industry ought to recognize that they were up against it, but he (Mr. Mason) suggested that the thing the industry was up against was not the "it" of inefficiency or cost, but that the "it" was very largely prejudice. The paper and the pictures exhibited provided evidence of the efficiency of gas which one could not possibly get past, and he suggested on behalf of the industry—about which, he said, there was no inferiority complex—that the gas side of the problem was well worth serious consideration.

Mr. W. J. Jones (Manager of the Lighting Service Bureau of the Electric Lamp Manufacturers' Association) was one of the principal critics of the paper, which, he suggested, was rather a defence of gas than an attempt to justify its use. One of his criticisms was to the effect that some of the slides illustrating the efficiency of gas lighting installations had not depicted the whole story. To support this contention he said that a picture had been shown of Tottenham Court Road, London, under artificial illumination, but it had not been stated by the authors that only the first two or three lamps in the picture were gas lamps, and that the lamps which had given good visibility in the distance were electric. Commenting on the authors' statements that there was a very large number of gas lanterns in use in this country, he said they had not stated that no less than one-third of the total street lighting used in the country was electric. During the last five or six years the number of electric lamp standards in use had increased by 100 p.ct. As to the claim that gas lighting was of particular advantage because it penetrated fog, for the last two or three years he had studied that problem, but had not yet succeeded in finding any definite evidence that gas light did penetrate fog any more than did electric light. In a criticism of the figures given in the paper, he said that Table 2 (which gave the commercial performances of various gas lighting schemes) gave details of burners in terms of mean horizontal candle-power, mean spherical candle-power, and mean hemispherical candle-power. In order to make a proper comparison, there should be one standard, and he pointed out that it was recognized internationally that the mean spherical candle-power was the only satisfactory basis for comparing light sources.

The President, replying to Mr. Mason, said that the statements made in the Presidential Address were considered statements; he

stood by them, and repeated that the Gas Committee in Leicester had not realized that they were right up against it. As an example of the attitude of the Electricity and Gas Departments, he said that in respect of one particular road in Leicester he had asked what would be the cost of laying mains or cables. The Gas Department had replied that the cost of laying the gas mains would be about £200, but the Electricity Department had offered to lay the cable for nothing. Before deciding in favour of electricity in the cases mentioned in his Presidential Address he had fitted up two streets with gas and electric installations as nearly as possible identical, and had made tests which had resulted definitely in favour of electricity, and he would be pleased to show Mr. Mason the complete files relating to these tests.

Victoria Embankment Lighting.

Mr. W. J. Jeffery (Charing Cross Electricity Supply Company), commenting on a statement by Mr. Winstone that there were no streets in this country having a standard of illumination equal to either Class A or Class B of the British Standard Specification, pointed out that he (Mr. Jeffery) maintained the electric lighting on the Victoria Embankment, London, under guarantee as being Class B illumination, and it was accepted by the London County Council, which was paying for it, as being Class B illumination. Commenting on the photographs which had been shown of gas-lighted thoroughfares, he said it was very difficult to judge the real effect of street lighting by photographs, and he urged that, to get proper comparisons, photographs should be taken on similar plates and should all be taken in the same way, so that they should be all standard.

Mr. Haydn T. Harrison referred to some of the difficulties of photographing artificially illuminated roads, though he was not a critic of the paper, because it contained extraordinarily useful information and figures.

Mr. J. H. Clegg (Burnley) put forward the suggestion that the gas industry was far too innocent, and did not realize the extent to which its competitors had gone in order to secure business; for example, perhaps it had not occurred to the gas industry to give away £200-worth of mains in order to secure the street lighting, but perhaps a shaking-up would do good. Why allow an electricity department to burn three tons of coal to produce the same amount of illumination as a gas undertaking could produce with one ton?

In emphasizing the manner in which cost of maintenance of gas lighting installations could be reduced by automatic control, he said that in the case of one high-pressure installation he had adopted group lighting, 16 lamps being lit at once, by increase of pressure. A governor was operated automatically by means of a relay at lighting up time, and the high-pressure gas was supplied to the lamps, and when the time arrived for the lamps to be extinguished the controller shut off the high-pressure supply and substituted a low-pressure supply for the by-passes. For the raising and lowering of lamps suspended overhead he had adopted a system patented by one of his assistants, an automatic clutch coupling being used. By this arrangement the gas connection was not broken, and the whole thing was not unsightly. Gas, he said, could do all that was required of it, and had not yet reached the limit of its possibilities.

Mr. Winstone, commenting on the remarks of Mr. Jones as to the lighting shown in the photograph of Tottenham Court Road, said the distance covered by the gas lamps was 350 yards; there were 22 gas lamps, and the only reason he could suggest as to why the electric lamps were not shown in the picture was that they had not had any effect on the photographic plate. [Laughter.] It was difficult to keep up-to-date figures of the number of gas and electric lamps in use throughout the country for public lighting, in view of the fact that hundreds were being installed every month. To Mr. Jeffery he replied that tests of the Victoria Embankment lighting had been made by an experienced photometician, and it had been proved to be Class C illumination.

Mr. Bishop agreed with Mr. Jones that a standard basis for comparisons of lighting was desirable. In using the standards referred to in the paper he had followed the custom, but he added that when it was his pleasure to give further details he would give them in terms of mean spherical candle-power rating.

PUBLIC LIGHTING PRACTICE OF THE SOUTH METROPOLITAN GAS COMPANY.

By The Company's Public Lighting Department.

This paper was given on pp. 579-85 of last week's issue. It was presented by Dr. J. S. G. Thomas, Senior Physicist to the South Metropolitan Gas Company.

Discussion.

Mr. S. B. Langlands (Glasgow), commenting on Dr. Thomas' reference to special nozzles, nipples, and burners built up for test purposes, paid a tribute to some pioneer work carried out some twenty years ago by Messrs. Mansfield, who produced nozzles and nipples so scientifically constructed that they had been used by his Department for standard testing. As the result of the use of these nozzles and nipples in the Laboratory at Glasgow over £30,000 had been saved in one year by the correlation of the air port, the nipple, the nozzle, and the tube. That fact emphasized also the value of a laboratory. Discussing a reference by Dr. Thomas to the use of a glass shade sand-blasted on the inner surface, he said that recent experiments in his Department had shown that a satin (acid) finish was very much superior in every way to a sand-blast finish. The satin finish, for example, absorbed very much less light than a sand-blast finish. With regard to reflectors of the cut-off type—which obscured the actual source of light from the eye—he said they were very effective, but the man in the street was usually dissatisfied if he was unable to see the light source. The lighting of a street in Glasgow, in which such reflectors were used, had been the subject of complaints, although the street was actually the best lighted street in the city.

Mr. C. H. Woodward (Bournemouth), discussing the deposition of dust particles on gas burners, pointed out that at Bournemouth there was a very high intensity of sodium chloride in the air, and the question one had to consider under those circumstances was how far a substance of that nature exercised a fluxing effect when it was associated more or less in the cyclonic combustion at the point of impingement of gas and air—*i.e.*, how far it provided an adhesive medium for agglutinating the dust particles which had been taken in.

Councillor Harry Sykes (Woolwich) asked Dr. Thomas the direct question as to whether or not gas lighting gave rise to glare. His reason for asking the question was that, whereas in the course of the discussions on the previous day the advocates of gas illumination had said that if gas were used for lighting the streets there would be no glare, Dr. Thomas, on the other hand, had made reference to a particular fitting, used on gas lamps at tramway points, and so on, to prevent glare.

A Speaker, who was concerned about the tendency, particularly on the part of the younger members of families, to interfere with fittings with a view to improving the lighting, without being aware of the possible consequences, urged that the rudiments of both gas and electricity should be taught in the schools.

Value of Reflectors.

Mr. Haydn T. Harrison congratulated Dr. Thomas upon the enormous amount of practical information he had given, and particularly because he had presented it so clearly that his audience could not only understand it but would retain it in their memories. A matter which gave him (Mr. Harrison) pleasure was that the gas industry were beginning to realize that reflectors had some value; those in the gas industry had done without reflectors for a long time—unless a small piece of porcelain at the top of a lantern could be called a reflector—and it was well that they should realize that they could do things even better than they had done, by the use of such devices.

Mr. E. J. Stewart, M.A., B.Sc. (Glasgow), was glad to find that during the conference so much attention had been paid to the value of the test room, suggesting, as it did, that there were opportunities for young men to enter the profession via the test room; it seemed to open up new possibilities for street lighting. He also emphasized that, because a test room was necessary in an independent public lighting department, the maintenance of fully equipped research laboratories on the manufacturers' premises was none the less necessary. After expressing the indebtedness of the profession to the manufacturers, both in the gas and the electrical industries, he said that part of the function of the testing staff of an independent lighting department was to act as a liaison between its own department and the manufacturers. For instance, if an installation or a particular fitting were condemned by the users of the streets as being inefficient, and if complaints were made to the manufacturers, the latter would probably say that they had never heard of such a thing before, and in cases such as that it was the duty of the test room staff to find out the real truth as between the two extremes. Thus, the lighting department's test room could work in harmony with the manufacturers' research laboratories—and the best manufacturers were willing always to investigate complaints. Discussing the tendency on the part of unauthorized persons to alter injector orifices in gas burners, he said this tendency was not confined to the ordinary members of the public, because even the lamplighters seemed to think that the best way to improve a light was to put more gas through the burner. In Glasgow, therefore, efforts had been made to find a material, for the making of the injectors, which would not be responsive to the needle of the lamplighter, and he asked Dr. Thomas if he had found such a material.

Dr. Thomas' Reply.

Dr. Thomas, in his reply, did not publicly take up Councillor Sykes' challenge with regard to glare, but said he would be pleased to discuss the matter with Councillor Sykes later. He agreed with Mr. Langlands that the satin finish on the inside of glass shades was preferable to sand-blast finish. The problem referred to by Mr. Woodward concerning the deposition of dust was very complicated, and he urged that it was well worthy of the attention of the most advanced physicists. While he appreciated Mr. Haydn Harrison's tribute to the paper, Dr. Thomas acknowledged at once that it was really due to the staff of the Public Lighting Department of his Company, and that thanks were due particularly to Dr. C. Carpenter (President of the Company) for having inspired most of the work. Finally, he found it difficult to say definitely whether or not one could make an injector which could not be tampered with by unauthorized persons, but the best that could be done so far was to use hardened metals.

Mr. Mason's paper on "The Lighting of Birmingham" was presented by Mr. R. Mackenzie (Assistant Superintendent of the Lighting Department at Birmingham), owing to the absence, through illness, of Mr. Mason. The paper was not discussed, it being pointed out by the President that it was not one of the type that lent itself to discussion, but was, on the other hand, a valuable and interesting statement of facts.

THE LIGHTING OF BIRMINGHAM.

By R. Mason, Public Lighting Superintendent, City of Birmingham.

[Extract.]

When I first entered the service in 1886, Birmingham boasted of about 7000 public lamps and less than 200 court lamps, all,

of course, of the flat-flame type. Nearly all these were consuming 4 or 5 c.ft. per hour, and one wonders what would be said to-day if our lamps were only giving an illumination equal to 16 candles. We had a few special lamps burning 15 and 20 c.ft. per hour, and even one or two over 30 c.ft. per hour; but, of course, the candle-power was very poor in comparison with the excessive consumption. Clean burners in those days were quite as essential as in the present, if not more so, for the slightest bit of dust would give a jagged flame; and it was a very sad day for the lamplighter if the then superintendent saw it.

I think the introduction of the incandescent mantle was as startling as the discovery of wireless. I can recall the incredulity of the superintendent whose comment was as follows: "You want to tell me that by putting a frock over a burner you are going to double or treble the candle-power." The drawback in those days was the cost of mantles and this naturally led to the introduction of anti-vibration devices. Many experiments were made by our own department, and ultimately it was decided to support the governor by means of springs and make the connection to the supply cock either with a rubber bag or tubing. The rubber connection was abandoned afterwards and the "bell jumper" substituted. This was continued until the introduction of inverted lighting, when the universal mantle was first used.

The transfer of the lighting from flat-flame to incandescent took many years to accomplish. Although the alteration showed a saving in gas, the Committee would not permit a too speedy change. All lamps had to be fitted with opal tops, and there was the additional cost of incandescent burners, mantles and chimneys, besides the establishment of what were termed "incandescent fitters," the men who cleaned the burners and changed the mantles and chimneys.

Long before this change had been carried out, in fact about 1904, experiments had been made in automatic lighting. At the outset there was, perhaps, a feeling of prejudice against the use of controllers. Immediately the question arose "What was to become of the lamplighters?" Whether the experiments were carried out to justify this prejudice it is difficult to say, but certainly positions were chosen for the controllers which did not tend to assist them in any way, with the natural result that they were deemed unsatisfactory.

The war was responsible for many things, and it certainly forced, through dire necessity, the spirit of experiment, and there is no doubt that inventions, in many directions, were preconceived before what might be termed their natural birth. Certain it is that the shortage of men during the war led to a determined effort in the use of automatic controllers; and that effort, being determined, proved successful. They were tried first of all in outlying districts where lamps were few and far between; and when it was found that they worked satisfactorily, their use was gradually extended. Of course, it will be remembered that during the war there was an enforced restriction of lighting, so that the actual extension of automatic lighting did not take place until afterwards. Then followed the great demand for houses, resulting in the rapid development of private and corporation housing estates, necessitating the erection of more lamps. Consequently the men who were released by the adoption of automatic lighting were able to be absorbed in the ever-increasing developed areas. Thus this has been one of those resorts to the adoption of mechanism which happily has not been detrimental to the existing employees. Here again the change was not a rapid one, but was spread over a number of years.

Now having given a very brief résumé of the gradual changes which have taken place in the lighting of Birmingham from my own experience, I will give you some particulars of the lighting as it exists to-day. I might mention that after repeated experiments it was decided to adopt universally the medium sized mantle, known as the No. 2. It was found that this could be satisfactorily filled with 2½ c.ft. of gas (C.V. 475) at a pressure of 4 in.; but it should be mentioned that all our lamps are fitted with governors, and the necessity of this cannot be too strongly emphasized. Where pressures varied on the district from 3 to 5 in. considerable difficulty was experienced in setting the gas and air regulators, particularly in the case of high-capacity lamps. Frequently on "lighting up" the whole of the mantles would be "blown off;" and it was found that only by the fitting of governors could this be remedied.

At the present time there are in the city 31,640 lamps; these comprise 31,145 gas lamps and 495 electric lamps.

They are divided as follows:

LOW-PRESSURE LAMPS.

Number of Lamps.	Capacity.
60	16 light
273	8 ,,
1,392	6 ,,
1,419	4 ,,
10,230	2 ,,
12,292	1 ,,
25,666	
Lamps in courts (1-lt.) 5,436	
31,102	(representing 55,360 burners)

HIGH-PRESSURE LAMPS.

Number of Lamps.	Candlepower.
38	4500
1	3000
4	1000
43	

ELECTRIC LAMPS.

Number of Lamps.	Watts.
4	1500
18	1000
19	500
141	300 (with 272 side-lts.)
28	100
13	60
223	

Mention might be made here regarding the spacing of lamps and also the aims in the distribution of the various capacities. It was an old regulation that before roads could be taken over by the Corporation as public highways, lamps should be provided at not more than 50 yards apart. Consequently this has been the standard on which most of the lighting has been carried out except, of course, the important central thoroughfares, where the lamps are spaced at 35 yards and in many instances less than this. In some of the areas added to the city when it extended its boundaries some years ago, the lamps are not so well spaced; but, as I have previously mentioned, I am gradually bringing these up to the city standard.

The following are the general lines on which the distribution of the lamps of various capacities is based:

Situation.	Capacity of Lamps Used.
Important central streets and large open spaces	8 and 16 lights.
Tram routes and main roads	4 lights with 6 lights at "stopping places" and "crossings."
'Bus routes, arterial roads, and "cross traffic" routes	2 lights with 4 lights at "stopping places" and "crossings."
Ordinary side roads	1 light with 2 lights at corners, and lamps opposite other thoroughfares.

It is our aim to keep the two-light lamp the minimum capacity for street lighting and to have at least four-light lamps on all 'bus routes and "cross traffic" routes. This is the end to which we are gradually working, but, of course, the progress will be necessarily slow in consequence of the additional cost of gas which such a scheme entails.

Another difficulty has been the increasing of the heights of the light source. Naturally, when lamps of a higher candlepower are used, full advantage can only be obtained by raising the light source. This has been done, in some instances, by the introduction of an extension piece to the existing column. In other cases, a large swan-neck bracket has been fitted to the column, but undoubtedly the better method is by the substitution of some of the new types of columns now specially designed for street lighting purposes. Unfortunately, this is a very costly alteration. In the case of tram routes this difficulty has been overcome by removing the lamp columns and fixing a six-light suspension lamp on the tram poles at a height of about 18 ft. The lamps are fixed on alternate poles on both sides of the carriageway at a distance of 40 yards apart. This method of lighting has proved very satisfactory and is nearly on a par with class "F" of the Street Lighting Specification. Nearly 300 lamps have been fitted in the city on this principle, and the system is being gradually extended. In some cases eight and sixteen light suspension lamps have been fixed in this way.

For the purpose of lighting, the city is divided into eleven divisions, each in charge of an inspector, who supervises on an average nearly 3000 lamps. It will, of course, be realized that the number of lamps in the central divisions, where the lamps are more closely spaced, is slightly in excess of those on the outside divisions, where the lamps are generally further apart.

Each division is divided into districts, which vary from 230 to 250 lamps. This number will again vary in accordance with the spacing of the lamps. The man in charge of the district is termed an auto-attendant, and his duty is to wind and set the controllers, clean the lamps, and re-mantle the burners when necessary, and patrol his district on specified nights.

The "winding" and "setting" is carried out on Monday and Tuesday, and the cleaning of the lamps is divided over the remaining portion of the week. The men patrol the districts on Monday, Wednesday, and Friday evenings. This arrangement permits of the whole of the lamps being cleaned once a week, but it has always been thought necessary that special lamps and lamps in important thoroughfares should be cleaned, at least, twice during the week. In order to carry this out, it has been necessary to institute special cleaning districts, where the work is performed by other men. The work on a district of this description consists of cleaning a specified number of

lamps each day, situated in main roads and important traffic routes, and patrolling the district on Tuesday, Thursday, and Saturday evenings. It will thus be seen that all the main roads and principal thoroughfares of the city, including tram, 'bus, and "cross traffic" routes, are patrolled every night of the week except Sunday. In this way failures due either to flash-light or clock defects are reduced to a minimum. The whole of the city is automatically lighted, and I can certainly say that as far as Birmingham is concerned the system has proved satisfactory.

It might be mentioned that the city has an area of 46,687 acres and a population of nearly one million. About 660 miles of street are lighted by gas and six miles by electricity.

PUBLIC LIGHTING AS VIEWED BY THE MOTORIST.

By H. Sturgess-Wells, J.P., County of Leicester.

[Extract.]

I was once travelling with an American Judge in the Far East, and in reply to one of my questions touching local government in U.S.A., he quoted this saying (attributed to a French statesman): "They are best governed who are least governed." That, to a certain extent, is the prevailing sentiment in the average motorist's mind in regard to the lighting of the highways. From the viewpoint of all forms of traffic, and in the interests of public safety, the streets should either be properly lighted or not lighted at all. All motorists know what a dreadful trial badly-lit roads are, and what a strain it is when driving at night to be for ever wondering whether something ahead on the road is merely a shadow or a pedestrian. A motorist feels safer in unlit roads, relying on his own headlights, than without them on roads intermittently lighted by public lamps without order as to position or spacing, or semblance of system quickly discernible by the "man at the wheel."

Think of the varied form of illumination the motorist encounters in taking a journey of, say, 50 miles. He will pass through areas controlled by perhaps 20 different authorities—municipal councils, urban district councils, parish councils, or even a parish meeting (there are 326 civil parishes in the County of Leicester), each authority having possibly its own different choice scheme of lighting its respective area, some of whom are carrying out their ideas in apparently haphazard fashion. Some sections of the highway may be supplied with a few oil lamps suspended at odd corners of streets only, other areas may have gas lamps with bare burners or "incandescents" dotted here and there (possibly alternately, on a winding road, causing the motorist to lose all sense of direction if relying on them), while others may have electric standards at regular spacings on one side of the road only, with part of their illumination obscured by trees planted too closely before (in the council's over-towering judgment) the "rateable value" of the particular road was deemed sufficient to have perhaps any public street lighting at all; each authority indulging in its own pet scheme or some authorities without any scheme at all.

I have indicated briefly "the motorist's dilemma," confronted as he is with such a variety of systems of public street lighting, and I would say that uniformity of highway illumination is one of the "crying needs" of all road-users at the present time, and the lack of it is the cause of much confusion to the great body of the motoring public. A notable omission has been made in the new Local Government Act of 1929 which transfers to County Councils control over *highways, but apparently no power to deal with lighting.*

Undue Responsibility on Lighting Engineers.

I feel that a heavy strain is placed on the skill and ingenuity and patience of our lighting engineers who have the responsibility on their shoulders of meeting the needs of all classes of road-users (complex as they are at present); and if by the pooling of their accumulated scientific knowledge and experience any improvements are evolved that may be the means of lessening the dangers of the road, then this conference will prove to have been a boon and a blessing to the community.

Safety Provisions not Made.

I referred to the heavy responsibility on our lighting engineers—I would say an undue responsibility is imposed upon them at present by the neglectful omissions on the part of the "powers that be" in the non-provision of possible assistance to them in certain forms.

As for instance:

(*a*) The making of *walking to the common danger* an offence. "Jay-walking" is punishable in the cities of Canada, Germany, America, as well as, I believe, in Australia and elsewhere. In busy areas in some cities the laws for the pedestrian are as stringent as for the motorist—the pedestrian who walks through a stream of traffic or who crosses at unauthorized places is liable to a fine as severe as the motorist who proceeds against signals.

In London last year, according to Lord Byng's report,

> "The number of people killed in street accidents, 1362, was the highest recorded in any year. Of these:
>
> 427 people are considered to have been killed crossing roads without due care;
>
> 113 by hesitating and faltering; and
>
> 78 by passing behind or in front of stationary vehicles.
>
> The continued casualness of many pedestrians suggests that the extent of the risk is not fully realized. More particularly is this the case as regards adults, among whom fatalities continue to rise; but it is satisfactory to note that the figures for children in Inner London show no upward tendency."

(*b*) The non-prosecution in some police districts (not in Leicester County) of cyclists who contravene the law by neglecting to carry rear-lights.

(*c*) *Non-provision of adequate side-walks.*—I would affirm that the cobbled causeways remaining in Leicester (relic of a bygone age) are conducive to accidents, in that they almost compel pedestrians to prefer walking in the superior roadways (and in saying this I cannot but add how much appreciated by motorists are the improved roads in the city—remade in recent years).

(*d*) Non-provision of definite crossing-places for pedestrians. "Please Cross Here" signs are a helpful reminder and may save lives.

(*e*) The lack of provision of *safety zones,* such as street refuge islands and tramcar-stop platforms.

These practices, I submit, besides imposing undue responsibility upon our lighting engineers, also impose added strain on drivers of *all* vehicles.

Gas or Electricity?

If I were asked whether I prefer gas or electricity, I would answer *gas,* for reasons of better dispersion of light without the concentrated bright patches which I have observed from electricity, which appear, in some schemes, to make the lighting effect "patchy" and to produce dark shadows in the road between the lamps, with which motorists are all too familiar.

I have also noticed how gas illumination appears better to penetrate fog, which is the reason for motorists using an orange screen on their electrically-illuminated headlights.

Discussion.

The President mentioned that the questionnaire referred to in the paper had been drafted by himself about a year ago with the intention that it should be handed to every motorist when receiving his licence, and he had hoped that in that manner he would have obtained valuable information for this conference. That, however, was not possible in the time, but he hoped that such information would be forthcoming in the future.

Mr. T. A. Kingham (Borough Electrical Engineer, Kingston-on-Thames) directed criticism to the Association itself and alleged that in the seven years of its existence it had done very little in the direction in which he considered it should work—viz., that it had not placed before the competent authorities a definite policy on the principles of lighting, and as to what it intended to do. It should place a definite policy before the Institution of Gas Engineers and the Incorporated Municipal Electrical Association, he urged, and then do something. In a criticism of the standard of lighting throughout the country, he alleged that 95 p.ct. of the towns in England had not re-arranged their street lamp spacing since 1890, and the posts were still 80 yards apart—which was all wrong. If street lighting were maintained as it should be it would attract the people into the centres of the towns and they would come in automatically to see the shops—and there would be no need for a cheap window lighting rate such as many engineers advocated.

Mr. C. S. Shapley (Leeds) disagreed with Mr. Kingham, and urged that during its seven years' existence the Association had done very great work. ["Hear, hear."] He also questioned on what authority Mr. Kingham had stated that 95 p.ct. of the towns of the country had not altered the spacing of their lamps since 1890. Such a statement, he said, could not be allowed to go unchallenged. There had been considerable improvement in towns such as Leicester, and considerable changes in the spacing of the lamps. The interest which the motorists' associations (the A.A. and the R.A.C.) were taking in the work of the Association placed it on a higher plane than it had occupied before, and showed that the lighting profession was a factor in national safety. He considered that the Association was as important as the Safety-First Council. In Leeds he was not stinted in regard to money for street lighting; but some towns had much to learn in the matter of allocating funds for this purpose, and more money should be spent in that direction, in the interests of safety. Discussing the lighting of new roads in which old trees were retained, he said he would not like to see those trees destroyed, because they were desirable from the æsthetic point of view, and he was afraid that lighting engineers would have to overcome the difficulties to which those conditions gave rise. He did not favour centrally-suspended lamps, because the height of the lamps was often governed by the height of the trams or 'buses passing below, and they often had to be suspended at such a height that much of the

illumination was lost. Again, as a motorist he preferred side-lighting in foggy weather; a motorist was apt to lose his direction, when lamps were suspended centrally, because he could not see from lamp to lamp, and further, he was apt to look upwards instead of on the road.

Motorists and Central Lighting.

Mr. G. C. Law (Hammersmith) also dissociated himself from the suggestion of Mr. Kingham that the Association, of which its members were so proud, had done little. Discussing street lighting systems, he said that in one avenue in his area, along which there were thickly grown trees, the lighting had been effected by centrally-hung lamps, and many people had thought the lighting to be a great success, but motorists had great difficulty in seeing people stepping off the paths. Therefore, in another street of the same character he had erected side columns, and, although he had had to spend about twice as much money there as on the lighting of the former street, the effect produced was much better.

Councillor Minshall (Chairman of the Sheffield Lighting Committee) also protested against Mr. Kingham's disparaging speech. He ventured to say that 95 p.ct. of the municipalities represented at the meeting would be included in the odd 5 p.ct. who (according to Mr. Kingham) had altered the spacing of the lamps since 1890. During the last six years the number of gas lamps in the streets of Sheffield had increased from 11,000 to 19,000, and in every town he visited a great deal had been done to improve lighting. As a very strong supporter of the Association, and one who realized the wonderful work it had done in establishing the position of lighting engineers and convincing public opinion that a gas lighting engineer was more than a lamp-lighter, he could not allow Mr. Kingham's remarks to pass unchallenged. He regarded the Association as one of the most useful in the country.

Mr. Jones (Loughborough) expressed the view that the only satisfactory system of lighting wide arterial roads having trees on either side was central suspension plus side lamps.

Councillor E. J. Clarke (Chairman of the Lighting Committee, Leeds) supported Councillor Minshall's remarks. With regard to Leeds, he said there were some 19,000 lamps to maintain and light, costing approximately £104,000 a year, or nearly an 8d. rate. He expressed himself as being in favour of side lighting rather than central suspension, one of his reasons being that the lamps had to be suspended at considerable height in order to allow the traffic to pass beneath them, so that much of the illumination was lost; another reason was that curious shadows were cast upon the road when double decked trams and vehicles of that kind passed beneath them. Finally, he expressed the view that, for the penetration of fog, there was nothing yet superior to the incandescent lamp, especially if it were placed at the side of the road. The motorist, he said, looked instinctively for lamps alongside the roads; they were in the nature of lighthouses to him in foggy weather.

Every Road Considered on Its Merits.

Mr. Harold Davies (Chesterfield), discussing the constitution of committees, said that in some towns it was the custom to ask the Gas, Electricity, Highways, and Watch Committees each to appoint two representatives to constitute the Lighting Committee, and the latter was not a standing committee. It had powers to requisition money from the Finance Committee, but very often the money advanced did not represent a reasonable figure in relation to rateable value. As to uniformity of lighting, he pointed out that this could not be achieved until they had uniform conditions; every road must be considered on its merits, having regard to buildings, trees, the road surfaces, and so on.

Mr. S. J. Patmore associated himself with the remarks of Mr. Kingham concerning the power of a well-lighted street to attract the public. In this connection also he pointed to the value of good street lighting as a means of improving also the shop lighting load, because it was generally found that when the lighting of a street was improved the shopkeepers in that street improved also the lighting of their windows and shop interiors—whether the lighting be effected by gas or electricity.

Mr. A. W. Blake (Willesden) put forward the view that public lighting had little to do with the degree of accidents, for the worst motoring accidents in his district, at any rate, had occurred during daylight. If coroners were better advised, he said, they would not make the silly remarks they sometimes made with regard to lighting, on the occasions of inquests.

Mr. Sturgess-Wells, in the course of his reply, urged the importance of designing new lighting schemes in such a way that they could be added to when conditions demanded, without the necessity for re-organizing those schemes. At Oadby he had tried to set out the lighting in such a way that as the parish developed and more lighting was required extra lamps could be provided between the existing lamps. Commenting on the remarks of Mr. Davies, he urged that street lighting, in view of its importance, should be controlled in the various municipal areas by independent committees rather than sub-committees, because often a sub-committee was looked down upon, whereas an independent committee was not.

BUSINESS MEETING.

The general business of the Association was then transacted.

The Scrutineers of the ballot for the election of three members to fill vacancies on the Council reported that Mr. W. H. Chapman (London), Mr. S. B. Langlands (Glasgow), and Mr. E. M. Severn (South Metropolitan Gas Company) were elected.

The Annual Report for 1929-1930 was presented and adopted. Thanks were expressed to the Hon. Editor (Mr. E. J. Stewart, of Glasgow) for having compiled this, the first document of its kind prepared by the Association.

Sub-Committees.

The President asked for the opinions of members as to the desirability or otherwise of forming the sub-committees which he had suggested, in his Presidential Address, should be formed to deal with the more important and outstanding problems before the Association. The proposed sub-committees were: (1) Parliamentary; (2) Tariffs; (3) Safety; (4) Technical.

After discussion, the matter was left in the hands of the Council.

Edinburgh Congress, 1931.

Colonel C. H. Silvester Evans (Hon. General Secretary, International Illumination Congress, 1931) referred to the meetings to be held in Edinburgh next September. It was suggested in the Association's Annual Report that the Association should hold its eighth annual meeting in Edinburgh, conjoined with the Edinburgh sessions of the International Congress, and that papers on street lighting be read there; further, that the Council of the Association might be responsible for making arrangements for the guests there. Some fourteen countries would be represented at the Congress, and it looked as though there might be about 600 delegates. Mr. R. Beveridge, the Inspector of Lighting in Edinburgh, and who had agreed to act as President for 1930-31, had consented also to act as convener of the Edinburgh Committee, and had some of the preliminary arrangements in hand.

Councillor J. C. McKechnie (Convener, Lighting and Cleansing Committee, Edinburgh) informed the members that the Town Council at Edinburgh had decided to entertain everyone attending the Illumination Congress there in September, 1931, and he himself assured the meeting that, if he remained Chairman of the Lighting Committee, he would be only too pleased to do all in his power to assist.

Mr. Liberty's Resignation.

The President, referring to the resignation of Mr. W. J. Liberty from the office of Hon. Secretary of the Association—which all regretted—reported that arrangements had been made whereby Mr. J. S. Dow, of "The Journal of Good Lighting," would become Hon. Secretary.

Votes of Thanks.

At the conclusion of the proceedings votes of thanks were accorded to the Lord Mayor and Corporation of Leicester for their hospitality to the Association during the conference, and to all who had helped to make it a success; also to the authors of papers and to the members of the Council for the past year.

ANNUAL DINNER.

The Association had the opportunity to entertain at dinner many friends and well-wishers on the occasion of the annual dinner, at the Grand Hotel, Leicester, on Wednesday.

A Gift to Mr. Liberty.

The work of Mr. W. J. Liberty for the Association, in the capacity of its Hon. Secretary, since its inception, and the part he played in its formation seven years ago, was recognized by the presentation to him of a wallet. (Mr. Liberty tendered his resignation some months ago, but, at the request of the Council, he continued to serve until after the Leicester meeting). The choice of Mr. S. B. Langlands to make the presentation was a happy, and, indeed, a natural one, inasmuch as he was also very closely concerned with the negotiations which culminated in the formation of the Association, and was chosen to occupy the position of President during its first year—a position which he occupied for the second time in the year 1929-30. He was pleased to have the opportunity again of giving credit for the Association's foundation to Mr. Liberty, as well as the credit for seven years' hard work on its behalf. Mr. Liberty could not go from among his friends on the Council without some recognition, and the members hoped he would recognize that his services had been at all times thoroughly appreciated.

Mr. Liberty, who was given an ovation, expressed his appreciation of Mr. Langlands' eulogy, and thanked the members generally for the friendly feeling which had prompted the gift. He assured them that he valued very highly the friendships he had made as the result of his contact with the Association, and that he would leave them with the most kindly feelings.

The toast of "The City of Leicester" having been honoured, Alderman W. E. Wilford proposed "The Association of Public Lighting Engineers;" remarking upon the assiduity and ingenuity which Mr. Wilkie had devoted to the improvement of the lighting of Leicester. Leicester was fortunate, he said, in having a Lighting Committee which was neutral in so far as the claims of gas and electricity were concerned, and it was able, therefore, to take advantage of both in these applications for which each was suited.

Mr. Wilkie, after a reference to some of his early difficul-

ties, endorsed Alderman Wilford's statement as to the absolute neutrality of the Leicester Lighting Committee, and added that no municipal official could hope to serve a better Committee. He took the opportunity also to express his gratitude to the Lord Mayor and Lady Mayoress of Leicester and the members of the Corporation generally for the hospitality extended to the Association during the meeting, and to thank his brother officials and the members of his staff for the efforts they had made to ensure its success.

Mr. HAROLD DAVIES proposed "The Visitors."

Mr. HAROLD E. COPP, who first replied, mentioned that something like 80 p.ct. of the public lighting of the country was effected by the service of gas. In some districts gas had been replaced by electricity, but this was hardly to be wondered at in these times, when electricity seemed to have captured the imagination of the public, though that, in his opinion, was a phase of doubtful stability, depending upon whether the various schemes fostered by successive Governments for the popularization of electricity would result in a very much cheaper supply of current than was available at the present time. The signs indicated that the reckless capital expenditure to achieve these ends might in a large measure defeat the objects which the promoters had in view. During the past few months he had visited several of the most important cities on the Continent, and there also he had found that nearly 80 p.ct. of the public lighting was effected by gas. He had been assured that the choice as between gas and electricity there was based simply on the grounds of economy and efficiency. In emphasizing that the larger the unit of light the greater the height at which it should be fixed, Mr. Copp suggested that gas men had rather lost sight of this point, because, although they had greater units of light available in the multiple burner superheated clusters, they had not taken pains to see that those lights had been placed on taller posts. They had been inclined rather to console themselves with the thought that the lamp-posts could not be moved from their existing situations. He pointed out, however, that extension pieces might be used for existing lamp-posts, to add (say) 3 ft. or 4 ft. to the heights, without much disfigurement. For units of 400 or 500 candle-power and over, new and longer steel lamp-posts of suitable design should be used, in order to secure even distribution of light.

Mr. JOHN W. T. WALSH also responded.

VISIT TO LEAMINGTON.

On the Thursday afternoon the Association paid a visit to Leamington, where they were accorded a civic welcome and entertained at tea in the Town Hall by the Directors of the Leamington Priors Gas Company.

The visitors were received by the Mayor of Leamington (Dr. R. F. Bury) and then adjourned for tea, which was partaken of in the Assembly Hall. The Mayor presided, and those assembled at the head table included the Lord Mayor and Lady Mayoress of Leicester, the Mayoress of Leamington (Mrs. Bury), Mr. Wilkie (President) and Mrs. Wilkie, the Mayor of Halifax, Alderman H. Mason, J.P. (Chairman of the Leamington Priors Gas Company) and Mrs. Mason, Alderman G. E. Gilbey (Chairman of the Leamington Watch Committee), Mr. and Mrs. H. G. Hawkes, Mr. W. J. Liberty (Hon. Secretary of the Association), and Mr. R. S. Ramsden (Engineer and General Manager of the Leamington Gas Company).

Mr. WILKIE thanked the Chairman and Directors of the Leamington Priors Gas Company for their hospitality; they were particularly indebted to Mr. R. S. Ramsden for having made such admirable arrangements. He had studied the gas lighting of Leamington's streets, which was certainly a credit to the Gas Company and to its General Manager.

Alderman H. MASON (Chairman of the Gas Company), in response, acknowledged the help readily given by the Association of Public Lighting Engineers whenever they had been consulted on any problem connected with the lighting of Leamington, and expressed the pleasure it gave his Co-Director, Mr. H. G. Hawkes, and himself to be able to thank them in person.

The public lighting of Leamington, which was inspected by the Association, is effected by gas throughout. The lamps on the parade are all Keith's nominal 500 candle-power high-pressure lamps, with the exception of a few Sugg's six-mantle upright "Littletons," a pair being fixed on brackets to each tramway standard. During the summer the standards are decorated with flower baskets fixed below the lamp brackets. The remainder of the old tramway route is lighted by means of Sugg's four-mantle "Littleton" lamps carried on brackets on the tramway standards, and the rest of the town is illuminated by Parkinson's 16-in. square two-mantle lanterns, with a few special lamps here and there. All the low-pressure lamps are fitted with Horstmann's clockwork controllers.

No More Matches

A Novel Automatic Gas Fire Lighter

How much time and temper, not to mention gas, is often wasted in lighting gas fires with matches! Even if the match box is handy, which is quite frequently not the case, some people are still nervous when lighting a gas fire because of the "bang."

Manufacturers have for long, therefore, been experimenting with a view to bringing out a gas fire lighter, fool-proof, simple to work, and nearly approaching the electric switch in efficiency of operation. This ideal would seem to have been attained in the "New Century" patent gas fire lighter, invented, patented, and manufactured by Messrs. Falk, Stadelmann, & Co., Ltd., of 83-93, Farringdon Road, E.C. 1.

There can be nothing simpler than this new patent. The action is similar to that of an electric switch. All that is required is to open the gas supply to the fire and to the lighter, pull down and release the striker, which will automatically flash back, igniting a pilot jet which directs a small flame on to the nearest radiant of the fire, lighting it simultaneously. The pilot jet tap can then be turned off. As the illustrations show, the lighter is simple in construction and neat in appearance, with nothing in its mechanism which can possibly go wrong.

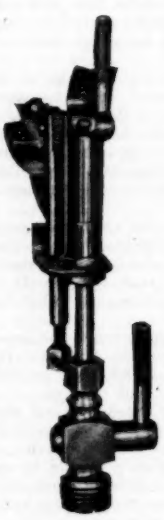
It is, of course, operated on the flint and steel principle, and is so arranged as to light several thousand times before the flint requires renewing. But when eventually it does require replacing, the top part of the lighter can be detached easily by means of unscrewing the union fitting it to the bottom part. The flint can then be replaced with the same ease as those fitted to the ordinary pocket lighter, of which millions are in use.

INSTANTANEOUS IN ACTION.

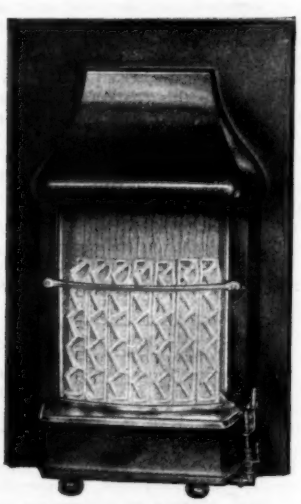
The main points to be remembered are—no matches; no by-pass jet continually burning gas; fool-proof; instantaneous in operation, so that there is no waste of gas as is often the case when striking matches. There is no fear of deterioration through heat from the fire, as the apparatus is so fixed as to be out of the direct range of heat, a fact which can be easily observed from the accompanying illustration of the lighter as attached to the "Silo" gas fire.

The "New Century" lighter, which Messrs. Falk, Stadelmann, & Co. and Messrs. Stoves, Ltd., of Rainhill, are supplying as a standard fitting to their "Silo" gas fire, can be fitted to any make of fire with the exception of Dog Grate patterns, and the firm are confident of bringing out in the near future an adaptation to operate in connection with this type of fire as well.

The lighter is of neat appearance and design, finished steel bronze, black lacquered, and it can be fitted to either left hand or right hand supply pipes, without in any way interfering with the gas supply. It is manufactured exclusively at the firm's Birmingham works.



The "New Century" Patent Gas-Fire Lighter.



The Lighter as Fitted to the "Silo" Gas-Fire.

Messrs. Falk, Stadelmann, & Co. state that several gas engineers who have inspected the new lighter have expressed their approval, and its simplicity of construction and ease of operation should make it at once popular, and within a short time, perhaps, a standard fitting to many of the well-known makes of gas fires.

REGISTER OF PATENTS

Naphthalene Removal.—No. 333,297.

GEWERKSCHAFT MATHIAS STINNES, of Essen-Ruhr.

No. 21,827; Feb. 6, 1929. Convention date, Feb. 6, 1928.

The following claims are made for this invention:

1. A process for removing naphthalene from coal distillation gases by treatment with solvents for naphthalene, comprising the steps: Compressing the gas, bubbling the resulting hot compressed gas through the solvent, and cooling the gas charged with solvent.

2. A process as claimed in claim 1, characterized by the feature that the solvent particles precipitated from the gas on cooling are separated and used again in the initial washing stage.

3. A process as claimed in claim 1 or 2, characterized by the feature that the solvent charged with naphthalene is freed from at least a part of the absorbed naphthalene by cooling, and is thereupon used again in the initial washing stage.

4. A process as claimed in any of the preceding claims characterized by the feature that the oil enriched with naphthalene which results from the process is allowed to cool to room temperature, and the cooled oil, which is saturated with naphthalene at room temperature, is re-used in the process for extracting naphthalene from compressed gas.

5. A process as claimed in any of the preceding claims, characterized by the feature that the bulk of the naphthalene is removed during the bubbling stage.

6. A process as claimed in claims 1, 2, 3, or 4, characterized by the feature that the bulk of the naphthalene is removed during the cooling stage.

Flueless Heaters.—No. 333,338.

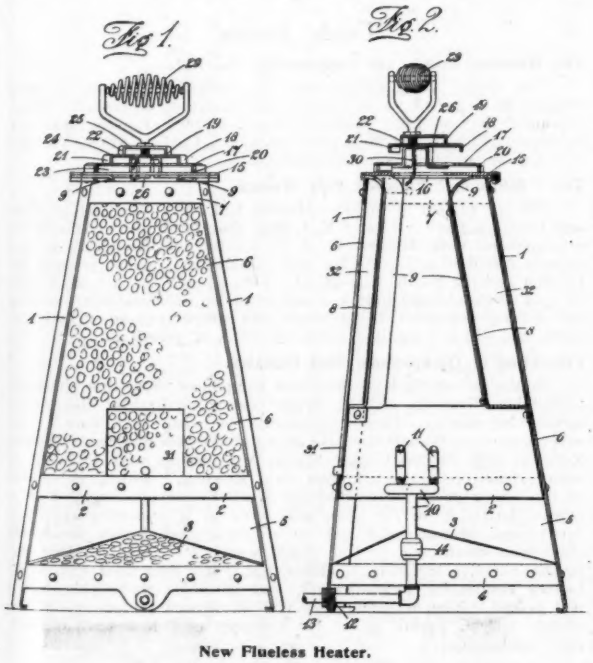
GAS LIGHT AND COKE COMPANY, CLARK, J. G., and MASTERMAN, C. A., all of Horseferry Road, Westminster.

No. 17,941; June 11, 1929.

This invention has for its object to provide an improved construction of heating appliance which may be used with gas or oil and which, while retaining the advantage of reflecting the light from luminous flames into the room, obviates the danger of the metal or material of which the appliance is made becoming excessively hot, the construction being such that the issuing products of combustion are air cooled so that the temperature of these products does not attain an excessively high value.

Fig. 1 is an elevation of a gas heating appliance according to the invention, and fig. 2 is a vertical section.

The appliance comprises a plurality of bars 1 interconnected by tie bars 2 to form a triangular upright structure adjacent to the



New Flueless Heater.

lower end of which is secured a reflector 3 which is preferably of polished and lacquered copper. The reflector 3 is of upwardly dished form and is visible from the exterior of the appliance the bars of which adjacent to the lower end are connected by tie bars 4. A space or opening 5 is left between the tie bars 2 and 4 for the admission of air and so that the reflector 3 can be seen through the openings 5. Secured to the tie bars 2 is a lining 6 which is secured to tie bars 7 arranged at the upper end of the bars 1 and suitably secured thereto. The casing 6 is preferably formed of metal and surrounds a lining or casing 8 disposed inwardly of the lining 6, such casing 8 forming a flue and being retained in position in the interior of the appliance by strap bars 9 secured at their upper and lower ends to the bars 1, as shown more particularly in fig. 2. 10 is a burner tube to which may be secured a suitable number of gas burners 11. The tube 10 passes through the reflector 3 and is connected as at 12 to one of the upright bars 1 to which is suitably connected a gas supply pipe 13. In the length of the tube 10 is preferably disposed a gas governor 14 which is adapted to limit the consumption of gas to a definite amount. On the upper ends of the bars 1 is secured a triangular cover plate 15 having an opening 16 and provided with upwardly extending lugs. On this cover is superimposed a plurality of baffle plates 17, 18, and 19, each of which is provided as shown at 20, 21, 22 with strut like supports. The lower baffle plate 17 is held in position on the cover plate 15 between the three lugs thereon. Openings 23, 24, 25 are thus provided between the plates, the opening 23 being provided between the lower plate 17 and the cover 15. The plates 17, 18, and 19 may be retained or clamped in position on the cover plate 15 by a dished member 26 having three equi-angularly arranged arms 27 outwardly bent so as to engage below the cover plate 15. A suitable handle 29 is secured in the retaining device 26 in such manner as to clamp permanently the superimposed baffle plates 18, 19 and to clamp the three baffle plates 17, 18, and 19 to the cover plate 15 to form a rigid whole. The retaining device 26 is connected to the upright appliance by a chain 30.

The casing 6 is provided with an upwardly slidable door 31 which may be glazed with coloured or transparent material, or the door may be non-transparent and made of any suitable material. The superimposed baffle plates 17, 18, 19 may be hinged at one of their angular corners to the cover 15 and secured thereto in such manner that they can be swung upwardly so that one or more than one of the openings 23, 24, or 25 can be varied as to its angular opening within suitable limits. The upper ends of the strap bars 9 are outwardly bent and secured to outwardly extending flanges on the bars 1 so that a space is provided between the cover 15 and the upper end of the casing 8. It will thus be seen that when the cover is in position on the appliance together with the superimposed baffle plates the products of combustion arising from the burners 11 flow upwardly through the casing 8 and induce a flow of cold air through the opening 5 which flows upwardly through the space 32 forming the cooling air jacket between the casings 6 and 8. Such cold air cools the products of combustion, and these issue from the upper end of the space between the casings 6 and 8 and are deflected laterally through the spaces between the cover 15 and the upper end of the appliance. The products of combustion escape through the opening 16 in the cover 15 as well as through the openings between the cover 15 and baffle plates 17 and 18, and are deflected by the baffle plates so that they escape laterally and mix with the comparatively cooler air issuing from the space between the casings 6 and 8.

Coke Discharge from Vertical Retorts. No. 333,381.

WEST, F. J., WEST, E., and WEST'S GAS IMPROVEMENT COMPANY, LTD., of Miles Platting, Manchester.

No. 23,622; Aug. 1, 1929.

This invention relates to vertical retorts having a pivotally mounted coke chamber with a reciprocatory ram or coke support therein, disposed beneath each retort to receive the coke and subsequently to effect its discharge during a pivotal movement of the chamber. The object of this invention is to provide an improved and simplified method of and means for effecting the discharge of the coke.

The coke chamber is closed at its lower end and has a plate or table therein which can be raised by means of chains, and is lowered by the weight of the coke. The chain pulleys and winding drums are carried by the coke chamber.

The method of operation is as follows: The coke chamber is brought into line with its retort and the plate or table brought to the top of the chamber by its chains to support the charge within the retort. Thereafter the plate is gradually lowered until the chamber is charged with coke. The chamber is then turned about its fulcrum point to bring its mouth or upper end clear of the bottom of the retort, the latter being then closed by a rejecting part upon the upper end of the coke chamber. Coke discharge is now effected by raising the plate in the chamber. Suitable guiding plates may serve to ensure that the coke as it is pushed out of the chamber is delivered into the hopper or receptacle provided for it. When the plate reaches the top of the chamber, it is in position to support the charge in the retort when the chamber is returned to its service position.

By discharging the coke upwards from the coke chamber, it is possible to simplify the mechanism for effecting discharge, including the means for making a gas-tight joint between the coke chamber and retort, for no joint need be made at the lower end of the chamber, which is normally closed, but which may have a detachable bottom for cleaning purposes.

Applications for Patents.

[Extracted from the "Official Journal" for Sept. 10.]

Nos. 26,001—26,710.

DYSON, G. M.—"Manufacture of gas taps." No. 26,478.

GASLOCK, LTD.—"Gaskets for high-pressure gas joints." No. 26,507.

KEITH, G. (KEITH & BLACKMAN COMPANY, LTD., J.).—"Gas-heated laundry irons." Nos. 26,438, 26,439.

THORP, F.—"Gas meters." No. 26,034.

WILSON, H. J.—See Gaslock, Ltd. No. 26,507.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

The general tone on the Stock Exchange last week was cheerful, although the volume of business was comparatively small. The gilt-edged section was active and rumour is again current as to the probability of a Government conversion operation, and in this connection the prospects of the 4 p.ct. War Loan (1929-42) and the 4½ p.ct. Treasury Bonds (1930-32) are favoured.

There were no outstanding items of interest to report in the gas section. The volume of business done was quite satisfactory, and at the commencement last week several issues were in good demand, notably Gas Light and Coke £1 units and Imperial Continental ordinary stock, although on the week both these securities lost ground, the former by 1¼d. to 18s. 9d.-19s. 3d. and the latter by 5 points to 355-375; Newcastle and Gateshead £1 units also fell 3d. to 15s. 9d.-16s. 3d. on the local exchange. Other than these, apart from ex div. markings, there were no falls in value. Those to record increases were Bournemouth "B" stock, which rose ⅜ to 12½-12¾ and this Company's 3 p.ct. and 4 p.ct. debentures, which gained 1 and 2 points respectively to 55-58 and 74-77; Cambridge 5 p.ct. debenture was also marked up 1 point to 94-97, and Cape Town 4½ p.ct. preference ¼ to 6¾-7¾.

Among last week's interim dividend announcements on ordinary capitals were the following: Alliance and Dublin 3½⅜ p.ct. (7s. 7½d. per £10 unit of stock) for half-year to June 30, and Bombay 3½ p.ct., both of which were the same as for the corresponding period last year.

Coal Markets.

Whatever views may be held as to the merits of marketing schemes in general, it will be a good thing for the coal trade when those to be enforced under the Coal Mines Act are ready. Especially in the export trade, upon which so much depends, there is complete stagnation pending announcements as to what minimum prices are likely to be. Exporters from the North-East Coast, for instance, are met everywhere with the idea that there will be a subsidy on exports, and naturally the foreigner will not buy ahead at present prices. The schemes are being shaped up at present, but great difficulty is anticipated in agreeing quotas. It is only natural that a colliery which normally works regularly should object to its cost per ton being raised by a restriction to eighty or any other percentage. If costs are raised in this way, it will be harder than ever to compete in the open market. It is reported, for example, that Poland is offering over next year at 11s. 1½d. a ton f.o.b. Northumberland steams are offered to-day at 12s. 9d. to 13s. 6d., which prices are little, if at all, above the cost of production.

Gas coals in Durham are a very poor market, and are showing no signs of any seasonal improvement. Quotations remain about the same, but orders are scarce. Wear specials ask 15s. to 15s. 3d. f.o.b., best qualities 14s. 6d. to 14s. 9d., and seconds 12s. 6d. to 13s. 3d. Yorkshire export prices for screened gas are 15s. to 16s.

Generally coke prices are easy for prompt, but gas coke is in good demand for all positions, and firm in price at about 21s. 6d.

Current Sales of Gas Products.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Sept.* 15.

The values of tar products remain unchanged.

Pitch is 47s. 6d. per ton f.o.b.

Creosote for export is 6d. to 6¼d. per gallon.

Pure toluole is 2s. 2d. to 2s. 3d. per gallon; pure benzole, 1s. 10d. to 1s. 11d. per gallon; 95/160 solvent naphtha, 1s. 5d. to 1s. 6d. per gallon; and pyridine bases, 3s. 9d. per gallon.

All these prices are *ex* sellers' works.

Tar Products in the Provinces.

Sept. 15.

The average prices of gas-works products during the week were: Gas-works tar, 20s. to 24s. Pitch—East Coast, 46s. f.o.b. West Coast, Manchester, Liverpool, Clyde, 46s. f.o.b.* Toluole, naked, North, 1s. 7¼d. to 1s. 8¼d. Coal-tar crude naphtha, in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 3d. to 1s. 3½d. Heavy naphtha, North, 11d. to 1s. Creosote, in bulk, North, liquid and salty, 3½d. to 3¾d.; low gravity, 1½d.; Scotland, 3¼d. to 3⅜d. Heavy oils, in bulk, North, 5½d. to 6d. Carbolic acid, 60's, 1s. 4½d. to 1s. 6d. Naphthalene, £10 to £12. Salts, £3 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum, 40 p.ct., purely nominal; "B" quality unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port, it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Sept.* 13.

There is little or no alteration to report in market conditions during the week. While quotations remain steady there is very little movement in most products, and stocks continue comparatively high.

Pitch.—Inquiries are scarce, and value remains nominal at 45s. to 47s. 6d. per ton f.o.b. Glasgow for export and about 45s. per ton *ex* works for home trade.

Refined tar to Ministry of Transport Specification is dull, with quotations at 3d. to 3¼d. per gallon f.o.r. works, exclusive of barrel hire.

Creosote.—Low gravity quality is finding a fair market, but other grades are quiet. B.E.S.A. Specification is 2¾d. to 3¼d. per gallon; low gravity, 3d. to 3¼d. per gallon; and neutral oil, 3d. to 3⅛d. per gallon—all f.o.r. works in bulk.

Cresylic.—Trading continues on a small scale. Pale 97/99 p.ct. is 1s. 7d. to 1s. 8d. per gallon; dark 97/99 p.ct., 1s. 6d. to 1s. 7d. per gallon; and pale 99/100 p.ct., 1s. 9d. to 1s. 10d. per gallon—all *ex* works naked.

Crude naphtha.—Available supplies command about 4¼d. to 4⅜d. per gallon, according to quality and district.

Solvent naphtha.—Prices are unaltered at 1s. 2½d. to 1s. 3½d. per gallon for 90/160 grade and 1s. to 1s. 1d. per gallon for 90/190 grade, in buyers' tanks.

Motor benzole is firm at 1s. 5⅜d. to 1s. 6½d. per gallon *ex* makers' works in bulk.

Pyridines.—Values are nominal; 90/160 grade being about 3s. to 3s. 3d. per gallon.

Benzole Prices.

The following are considered to be the market prices at the present time:

	s. d.	s. d.	
Crude benzole . . .	0 10	to 0 11	per gallon at works
Motor ,, . . .	1 5½	,, 1 6½	,, ,, ,,
Pure ,, . . .	1 10	,, 1 11	,, ,, ,,

Trade Notes.

The Horseley Bridge and Engineering Co., Ltd.

The above firm, with whom are associated Messrs. Thomas Piggott & Co., Ltd., and Messrs. Guest, Keen, & Piggotts, Ltd., announce that as from Monday, Sept. 15, their London staff are occupying more commodious premises at 22, Carlisle Place, Victoria Street, S.W. 1. Telephone: Victoria 3836.

The "Johnston" Patented Pipe Wrench.

We are advised by Messrs. Mosers, Ltd., of 4, Marshalsea Road and Borough High Street, S.E. 1, that they have just concluded an arrangement with Messrs. R. & J. Rankin, of Liverpool, to act as sole distributing agents for the "Johnston" patent wrench for London and the South of England. This wrench is used extensively by gas undertakings and is a self-adjusting, self-releasing wrench and spanner combined, being handy and compact, operated with one hand, and will grip easily a worn, corroded, or greasy nut.

Prevention of Occupational Skin Diseases.

Statistics compiled by insurance companies show that the compensatable disability arising from occupational skin diseases is rapidly increasing. That "prevention is better than cure" was never more true than in the case of industrial skin diseases. Messrs. Rozalex, Ltd., of 26, Cooper Street, Manchester, wish to bring to notice their preparation known as "Rozalex," which, if applied to the hands prior to commencing work by anyone engaged in a process irritating to the skin, will serve as a protective covering. At the end of working hours an ordinary wash leaves the hands clean and unaffected by the day's work. "Rozalex" does not possess curative medicinal qualities, but it has been used with satisfactory results for several years, and its value thoroughly tested and proved. The manufacturers will be pleased to forward a free sample and to submit prices for a supply of "Rozalex" in bulk upon application.

Contracts Advertised To-Day.

Gasholders.

The Gas and Lighting Committee of the St. Helens Corporation invite tenders for the supply of a spiral-guided gasholder and foundations or, alternatively, for a waterless holder, &c., and foundations. [Advert. on p. 656.]

Pipes.

The Chelmsford Corporation Gas Department invite tenders for the supply of cast iron and steel mains and specials. [Advert. on p. 656.]

STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Sept. 12.	Rise or Fall on Week.	Transact'ns Lowest and Highest Prices During the Week.
£			% p.a.	% p.a.				
171,978	Stk.	Aug. 14	5	5	Aldershot 5 p.c. max. C. .	73—78	..	75
522,992	,,	,,	4	4	Do. 4 p.c. Pref. . .	68—71	..	..
1,551,868	,,	Apl. 3	7½	7½	Alliance & Dublin Ord. . .	92—95	..	93
374,000	,,	July 10	4	4	Do. 4 p.c. Deb. . .	60—63	..	..
522,655	,,	Aug. 28	7	7	Barnet Ord. 7 p.c. . . .	106—109	..	107+
300,000	1	Apl. 24	1/4½	1/7½	Bombay, Ltd.	16/- 18/-	..	16/-
174,500	10	Aug 14	9	9	Bournemouth 5 p.c. . . .	14—15	..	..
500,050	10	,,	7	7	Do. B 7 p.c. . .	12½—12⅝	+⅛	12⅝—12½
439,160	10	,,	6	6	Do. Pref. 6 p.c. .	10⅝—11½	..	11⅛
50,000	Stk.	June 26	3	3	Do. 3 p.c. Deb. .	55—58	+1	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb. .	74—77	+2	74½—74⅝
357,900	,,	Aug. 28	7½	7½	Brighton & Hove 6 p.c. Con.	112 117	..	..
871,880	,,	,,	6½	6½	Do. 5 p.c. Con.	99—102	..	..
1,287,500	,,	July 24	5	5	Bristol 5 p.c. max. . . .	88—89a	..	..
855,000	,,	Apl. 8	7	8	British Ord.	110—115	..	113—114½
100,000	,,	June 26	7	7	Do. 7 p.c. Pref. . . .	112—117	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. . .	70—73	..	73
450 000	,,	,,	5	5	Do. 5 p.c. Red. Deb. . .	94—97	..	94—95½
100.000	,,	June 26	5	5	Cambridge 5 p.c. Deb. . .	94—97	+1	..
100.000	10	May 22	6	10	Cape Town, Ltd	9—10	..	..
100 000	10	Apl. 24	4½	4½	Do. 4½ p.c. Pref. . .	6½—7½	+½	..
150,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb. . .	71—76	..	..
626.860	,,	July 24	6	6	Cardiff Con. Ord.	94—97	..	..
237 860	,,	June 26	7½	7½	Do. 7½ p.c. Red. Deb.	97—100	..	..
157,150	,,	Aug. 14	6½	6	Chester 5 p.c Ord.	86—91b	..	..
98.936	1	May 8	†2/-	†2/	Colombo, Ltd. Ord. . . .	33/—35/-	..	..
24,500	1	,,	1/1½	1/1½	Do. 7 p.c. Pref. . .	1s/6 - 20/6	..	..
609,204	1	Apl. 3	1/9½	1/9½	Colonial Gas Assn. Ltd. Ord	17/—19/-	..	..
296.053	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	19/—21/-	..	..
2.073.280	Stk.	July 24	7	6	Commercial Ord.	94—97	..	95½
475,000	,,	June 26	3	3	Do. 3 p.c. Deb. . . .	56—59	..	..
787,560	,,	Aug. 14	7	7	Croydon sliding scale . .	104—107	..	..
453,100	,,	,,	5	5	Do. max. div. . . .	81—84	..	82½
542 270	,,	Aug. 14	10	7	Derby Con.	115—125e	..	..
55,000	,,	June 26	4	4	Do. Deb.	65—70e	..	..
209 000	,,	Aug. 28	5	5	East Hull Ord. 5 p.c. . . .	69—71	..	..
1,002,180	,,	Mar. 20	†4g	†7g	European, Ltd.	110—120	..	113½—115½
18,629,125	,,	July 24	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	18/9—19/3f	—1½d.	18/9—19/
2,600,000	,,	,,	3¼	3¼	Do. 3½ p.c. max. . . .	63—65	..	63—64⅜
4,157 020	,,	,,	4	4	Do. 4 p.c. Con. Pref. . .	78—81	..	79⅜ 80
5.602,620	,,	June 26	3	3	Do. 3 p.c. Con. Deb. . .	59—62	..	60—61½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. . .	98—101	..	..
161,4•0	,,	Sept. 11	10	10	Harrogate Cons. 10 p.c. max.	155—160*	—3	..
82.500	,,	Aug. 28	7	7	Hastings & St. L. 5 p.c. Conv.	97—102	..	..
258.740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	76—81	..	78½—79½
70,000	10	May 22	†10	1	Hongkong & China, Ltd. .	13½—14½	..	..
213,200	Stk.	Aug. 14	6	6	Hornsey Con. 3½ p.c. . . .	88—91	..	90
2 43*,594	,,	May 22	10	25	Imperial Continental Cap. .	355—375	—5	358—375
223,130	,,	Aug. 14	3½	3½	Do. 3½ p.c. Red. Deb.	80—85	..	..
235,242	,,	Aug. 14	8½	8½	Lea Bridge 5 p.c. Ord. . .	123—128	..	124
2,145,907	,,	Aug. 14	6	6	Liverpool 5 p.c. Ord. . . .	90½—91½b	..	..
600,000	,,	Mar. 20	7	7	Do. 7 p.c. Red. Pref..	100—102b	..	..
165,786	,,	Aug. 28	8	9	Maidstone 5 p.c. Cap. . .	120—125	..	..
63,480	,,	June 26	3	3	Do. 3 p.c. Deb. . .	51—54	..	..
75,000	5	June 26	†10	†10	Malta & Mediterranean . .	5½—6	..	..
392,000	—	Apl. 1	5½	5½	Metrop'itan (of Melbourne) 5½ p.c. Red. Deb. . . .	90—93	..	..
541,920	Stk.	May 22	†6	†8	Montevideo, Ltd.	105—110	..	109
2,061,315	,,	July 24	5⅜	5	Newcastle & Gateshead Con.	15/9—16/3d/	—3d.	..
682,856	,,	,,	4	4	Do. 4 p.c. Pref. .	70½—71½d	.	..
691,705	,,	June 26	3½	3½	Do. 3½ p.c. Deb. .	66⅝—67½d	..	..
169,940	,,	Aug. 28	7½	7½	North Middlesex 6 p.c. Con.	106—111	..	..
396,160	,,	Aug. 14	5	5	Northampton 5 p.c. max. .	76—81	..	..
300,000	,,	Apl. 24	9	7	Oriental, Ltd.	108—113	..	111½
60,000	5	18 My., '15	—	—	Ottoman	0—½	..	1/-
205,162	Stk.	June 26	8	8	Plym'th & Stonehouse 5 p.c.	110 115	..	..
424,416	,,	Aug. 28	8	8	Portsm'th Con. Stk. 4 p.c. Std	107—112	..	..
241,446	,,	,,	5	5	Do. 5 p.c. max. . .	77—80	..	..
186,000	100	June 2	4	4	Primitiva 4 p.c. Red. Deb. .	96—99	..	..
677,837	Stk.	July 24	4	4	Do. 4 p.c. Red. Deb. 1911	81—84	..	83
371,496	,,	June 26	4	4	Do. 4 p.c. Cons. Deb. .	81—84	..	..
150.000	10	Apl. 3	6	6	San Paulo 6 p.c. Pref. . .	8½—9	..	..
1,736 968	Stk.	Aug. 28	6½	6½	Sheffield Cons.	100—103e	..	..
95,000	,,	July 10	4	4	Do. 4 p.c. Deb.	76—78e	..	..
90 000	10	June 5	‡4	‡5	South African	4—6	..	..
6.709.895	Stk.	Aug. 14	7½	5	South Met. Ord.	102—104	..	103—104
500,000	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	107—110	..	..
1,895 445	,,	July 10	8	8	Do. 8 p.c. Deb. . .	58—61	..	59⅜—60⅜
734,000	,,	S·pt 11	6½	6½	Do. 6½ p.c. Red. Db.	98—100*	—1	..
91,500	,,	Aug. 14	8½	8½	South Shields Con. . . .	103—104d	..	..
1,543,795	,,	July 24	6½	6½	South Suburban Ord. 5 p.c.	100—103	..	..
468,837	,,	June 26	5	5	Do. 5 p.c. Deb.	93—96	..	..
647,740	,,	Aug. 28	5	5	Southampton Ord. 5 p.c. max.	74—77	..	..
121,275	,,	June 26	4	4	Do. 4 p.c. Deb.	73—76	..	..
179,014	,,	July 24	8	8	Sutton Ord.	110—113	..	..
94,500	,,	June 26	5	5	Do. 5 p.c. Deb. . . .	93—96	..	..
250,000	,,	Aug. 28	7	7	Swansea 7 p.c. Red. Pref. .	98—101	..	..
200,000	,,	June 26	6½	6½	Do. 6½ p.c. Red. Deb. .	98—101	..	..
1,076,490	,,	July 24	6⅜	6⅜	Tottenham District Ord. .	102—106	..	103—103½
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. . .	95—98	..	..
199,005	,,	June 26	4	4	Do. 4 p.c. Deb. . .	75—78	..	..
182,380	10	30 Dec., '12	—	—	Tuscan, Ltd.	3⅜—4⅜	..	..
85,701	Stk.	Mar. 20	6	6	Do. 6 p.c. Red. Deb.	75—80	..	..
309,094	,,	Aug. 28	7	7	Uxbridge, Maidenhead, & Wycombe 5 p.c.	95—100	..	..
88,330	,,	,,	5	5	Do. 5 p.c. pref. . .	85—90	..	..
1,180,970	,,	July 10	—	7	Wandsworth, Wimbledon, and Epsom Cons. . .	107—112	..	..
200,000	,,	,,	5	5	Do. 5 p.c. Pref. . . .	89—92	..	..
488,344	,,	June 26	5	5	Do. 5 p.c. Deb. . . .	96—99	..	98—98½

a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle. e.—Sheffield. f.—The quotation is per £1 of Stock. g.—Paid on £10 shares. * Ex. div. † Paid free of income-tax. ‡ For year. § Div=10 p.ct. p.a. less tax and less tax on interim dividend.

TROTTER, HAINES, & CORBETT LIMITED

BRETTEL'S ESTATE

FIRE-CLAY & BRICK WORKS

STOURBRIDGE

Manufacturers of GAS RETORTS, GLASSHOUSE FURNACE & BLAST FURNACE BRICKS, LUMPS, TILES, and every Description of FIRE BRICKS.

Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.

SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

LONDON OFFICE: E. C. BROWN & Co., LEADENHALL CHAMBERS, 4, ST. MARY AXE, E.C.

THAMES BANK IRON Co., Ltd.,

LODGE ROAD, ST. JOHN'S WOOD, LONDON, N.W. 8.

Telegrams: "HOTWATER, 'PHONE, LONDON."
Telephones: CUNNINGHAM 1191, 1192, and 1193.

C.I. Socket & Spigot PIPES and Fittings.

GAS SYPHONS.

Flange Pipes & Specials.

LARGE SELECTION IN LONDON STOCK.

(This announcement is inserted gratuitously.)

PETER—WITH ONE EXCEPTION

With one exception Peter is an ordinary little fellow. Chubby, likeable, just five-and-a-half, full of life and fun and on occasions—be it admitted—of naughtiness.

Just now Peter's rather important, for this is his first term at school, and he's grappling with the intricacies of "A B C" and "Twice Two"; difficult subjects to all men of five-and-a-half, but even more difficult in Peter's case because—bad luck—he's totally blind. That's his One Exception.

Peter learns reading, writing, and 'rithmetic through the medium of "Braille"—dull stuff compared with the coloured picture books of most five-and-a-halfs. However, he's a stout lad is Peter, and he's making great progress.

Would you like to know more about him? How, in spite of his "One Exception," he is being educated, and, when older, technically trained and usefully employed.

There is a long waiting list of "Peters" throughout the British Isles, for whom training and accommodation must be provided in the immediate future.

Will you help with a donation or annual subscription? Any sum, large or small, will be gratefully received.

Here's a suggestion. Your eyesight is worth 3d. a year to you. Send Peter and his handicapped pals 3d. for every year you've had it. Now, please, in case it slips your memory. Good idea!

THE CHAIRMAN,
SCHOOL FOR THE BLIND
(Founded 1838),
Swiss Cottage, LONDON, N.W. 3

THE NEW PATTERN
SIMMANCE PATENT

DEAD-BEAT RECORDER

NO CHANGE IN QUALITY
IMPROVED DESIGN

REDUCED PRICE

Minimum Vacuum : 1 inch water
Maximum Vacuum : 15 lbs. per square inch
Minimum Pressure : 1 inch water
Maximum Pressure : 400 lbs. per square inch
or combination of Vacuum and Pressure

ALEXANDER WRIGHT & CO., LTD.
WESTMINSTER, S.W. 1

CONTENTS

EDITORIAL NOTES.

A GLANCE AT THE CONTENTS . . . 685
Carburetted Water Gas 686
The Selling Unit 686
Three Types of Student 686
The Crucial Point 687
Declared Calorific Values 687
Board of Trade Return 688
A National Council of Industry 688
The Juniors—Gas Lights—London's Most Important Thoroughfares—Phenol in the Printing Industry 688

Forthcoming Engagements 688
Obituary—
Prof. H. B. Dixon, C.B.E., D Sc, Ph.D., F.R.S. 689
Personal 689

CORRESPONDENCE.

The "Gas Unit" 689

THE NEWS OF THE WEEK.

Saving at Matlock—Exhibition at Halifax—Yeadon and Guiseley Gas Company—National Smoke Abatement Society—Eastern Counties Gas Managers' Association—Blackburn Gas Department's Annual Outing—Managers' Course of Staff Training—Re-Organization of the Higginshaw Works, Oldham—Important Development at Brigg (Lincs.)—Hospital Authorities and Smokeless Fuel—Need for Extensions at Sedgley—Lectures on Gas Meters—"Coke for Blast Furnaces" 690
Ipswich Company Seek Further Powers . . 690
Prizewinners in the City and Guilds Examination 691
The New Season Davis Fire Catalogue . . 691
"All-Gas" Exhibition House in Liverpool . 691
Will Thorne's Appeal to Gas Consumers . 691
What the Gas Industry is Doing 691
Statistics Relating to Tar and Bitumen . . 692
Ten-and-a-Half Million Tons of Coal . . . 692
A Century of Gas Progress in Liverpool . . 692
Gas Supply in Swanscombe Council Houses . 692
Notes from Scotland 692
Company Results at June 30 693
Notes on New Books 693
Opening of New Sports Ground and Pavilion at Richmonds' Warrington Works . . . 694
Popularizing Gas Appliances 695
Building Exhibition at Olympia—Sept. 17 to Oct. 1 696

THE "JOURNAL" TECHNICAL RECORD.

Wales and Monmouthshire District Institution of Gas Engineers and Managers—General Business 699
Declared Calorific Values and Pressures. By J. Mogford 700
Luncheon 702
Carburetted Water Gas and the Influence of Temperature on the Composition of the Tar Formed. By T. B. Glover 702
North British Association of Gas Managers—Thoughts at Random. By Peter M. Sim . 705

GAS MARKETS AND MANUFACTURES.

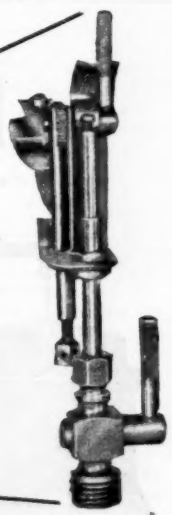
Stock Market Report 710
Coal Markets 710
Current Sales of Gas Products 710
Trade Notes 710

Stock and Share List 711

"JOURNAL" Telephone: Central 6055 | For Advertisers' Index—see p. 716

THE "NEW CENTURY"
PATENT
GAS FIRE LIGHTER
BRITISH MADE

To turn on a Gas Fire WITHOUT a Match and WITHOUT a By-pass is now possible by means of the "NEW CENTURY" Gas Fire Lighter. The operation is as simple as that of an ordinary Switch.



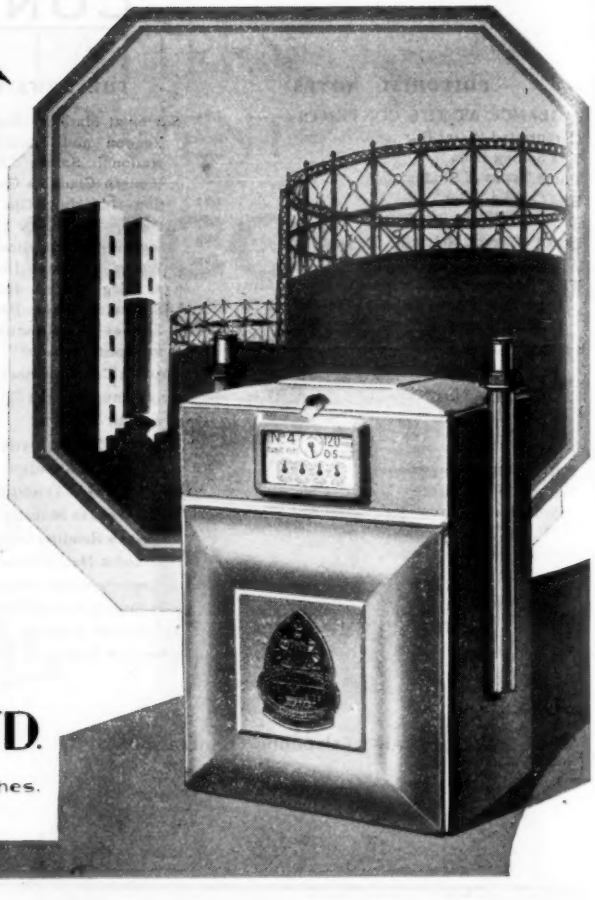
The "NEW CENTURY" Lighter, as fitted to the "SILO" Gas Fire. It is neatly fixed by the side of the Fender. The most exhaustive test will immediately establish confidence and prove that a more perfect and simple method of lighting a gas fire is almost impossible.

Falk, Stadelmann, & Co. LTD.
VERITAS LIGHT WORKS

83-93, FARRINGDON ROAD, LONDON, E.C. 1

Glasgow, Manchester, Birmingham, Dublin, Newcastle-on-Tyne, Cardiff, Leeds, Liverpool.

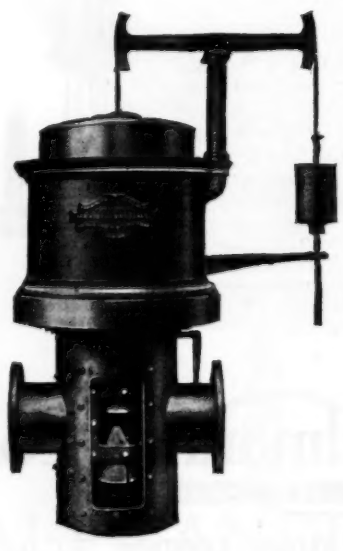
Empire Products



Tin from the Straits, leather from India, plate from Wales—every part of the Thomas Glover meter is produced within the Empire. The Thomas Glover meter is British throughout and best at all times.

THOMAS GLOVER & CO. LTD.
Original Dry Meter Makers : Established in 1844.
Gothic Works : EDMONTON. LONDON N18. & Branches.

PARKINSON'S GOVERNORS



CAN BE DESIGNED TO CONTROL

PRESSURE with Varying Quantity.

QUANTITY with Varying Pressure.

PROPORTION with Varying Quantity and Pressure

WEIGHT, WATER, OR GAS PRESSURE LOADING.

W. PARKINSON & CO.,
INCORPORATED IN PARKINSON & COWAN (GAS METERS), LTD.

COTTAGE LANE, CITY ROAD, LONDON, E.C.1.	BELL BARN ROAD, BIRMINGHAM.	RAPHAEL STREET, CROMAC STREET, BELFAST.
Telegrams: "INDEX, 'PHONE, LONDON."	"GASMETERS, B'HAM."	"PREPAYMENT, BELFAST."
'Phone Nos.: 4270 Clerkenwell	2245 Midland, B'ham.	3374 Belfast.